# Secondary-Postsecondary Interface Project II:

# Nature of Students



VOLUME 1

By

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Summary by

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This research project was funded under contract by the Ministry of Education, and the Ministry of Colleges and Universities, Ontario.

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Because of the extreme pressures we felt, and often could not help communicating to those whose assistance we sought, those of us who bore the major responsibility for designing and conducting Project II and for making this report are uncommonly aware of the thanks we owe--and want to express.

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those to whom Project II must have seemed an unnecessary extra. Their contributions were necessary--and are appreciated.

Ross Traub
Richard Wolfe
Carla Wolfe
Peter Evans
H.H. Russell

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## SUMMARY CHAPTER

### 1. INTRODUCTION TO THE PURPOSE AND DESIGN OF THE STUDY

The purpose of Project II was to examine the "nature of students" near the Interface between schooling at the secondary level and postsecondary education of one sort or another.

In an ideal world, a study with such a purpose would probably be longitudinal in design. Beginning in Grade Twelve, the career path of every individual in a representative sample of students would be traced over five or six years, and questions would be asked: What details of his family background might be related to his schooling? In Grades Nine, Ten and Eleven, what subjects did he take, and at what levels, and with what success? By Grade Twelve or Thirteen, where did he think he was headed? What senior secondary courses did he take to prepare his way there? How well did his teachers find he did in those courses? How well did he do on standardized tests related to some of those courses but administered externally and all across the province? Did the instructors he found on the postsecondary side of the Interface consider his high school preparation adequate? In his first year, did he appear to benefit from what they, in their turn, offered him? Did he follow his chosen course to a successful conclusion? Looking back, what clues were there--at the time of Interface--to the eventual outcome of his postsecondary career? Though these were the sorts of questions that concerned us in Project II, we had only a part of one school year in which to work with them. And so, instead of watching students move across the Interface, we examined--by means of separate surveys--the nature of students on each side of it in the spring of 1976: Grade Twelve and Grade Thirteen Students

(subjects of our "SSGD/SSHGD Surveys") on the one side, and students completing their first year of university (subjects of our "University Records Survey") on the other. Emphasis fell heavily on the former group.

Emphasis fell too on achievement; in fact, Project II might almost be re-titled The Nature of Student Achievement, because the loud and common questions, "What are they learning in high school? What do they know, what can they do when they graduate?" express--crudely--concerns provoking the study. A slightly more subtle question, "How do we know what they're learning?" gets to the crux of the problem.

## 1.1 The SSGD/SSHGD Surveys

Measurement is an extremely complex endeavour, and yet basically there are only two ways of approaching the task of measuring human performance, whether that performance be academic, athletic, social, emotional, or whatever. Measurement standards can arise from within the self and be relevant only to the individual, or else they can be applied from without and to some population containing other individuals as well as the self. Trying to maintain self-respect and identity within a social framework, all of us, in our personal lives, constantly juggle these two types of assessment. It is a sign of our educational system's humanity that it too is a juggler. To simplify: in the sixties it became apparent that external and universal standards of measurement had been in hand too long; the "departmentals" were discontinued and attention shifted to the individual with his own potential as his measuring stick. Provision for individual differences--culminating eventually in the Credit System--received education's emphasis; evaluation was accordingly seen as the domain not of the disinterested, but rather of the concerned and involved. But then a cry went up from a society that felt overcome by the task of making comparisons and selections from among hosts of "unstandardized" individuals.

In examining the nature of student achievement by means of the SSGD/SSHGD Surveys, Project II aimed to discover to what extent an apparent juggling act was actually a balancing act; that is, to what degree uniform standards had not been abandoned--tossed away--but were in fact underlying and applicable to individualized learning and individualized assessment. For this purpose Project II had to compare the performances of groups of senior secondary school students on standardized achievement tests administered across the province, and also to observe the relationship between student performance as measured by those external tests and student performance as reported by the involved educators in the different schools.

Though the study's chief focus, then, was on student achievement, the "nature of students" was by no means ignored. Every student who wrote an achievement test provided as well--by means of a Student Questionnaire designed for the study--certain information regarding his or her age, sex, language(s), parents' education and occupations, and--most significantly for our purposes--personal plans for further education and/or career. Since answers to these questions were likely to have considerable bearing on academic performance, any meaningful examination of student achievement had correspondingly to take them into account.

## 1.2 The University Records Survey

For students completing their first year at university, data somewhat parallel to that collected for secondary school students was assembled, though no Project II instruments were administered directly to this postsecondary group. Personal information (roughly equivalent to that solicited by the Student Questionnaire) was obtained from records at the Ontario Universities Application Center. Those records were also our source for information regarding the students' secondary school performances (the numbers of SSHGD credits they had earned, the subject areas of the SSHGD courses they had taken, and the marks they had achieved in those courses) as reported by their high

school teachers and principals in the spring of 1975. (It was on the basis of those reports that the students had been admitted into the first year programs which they were now pursuing.) Once again, as with the school marks for the students in the SSGD/SSHGD Surveys, our interest lay less in the marks themselves, than in how they compared with the results the students achieved on a different measure of achievement, in this case, the measure of first year university.

More than one research study has shown that up until 1968 departmental examination results predicted success at university very well. By means of the University Records Survey, Project II hoped to be able to make some assessment of the predictive value of high school marks in 1975--nearly a decade after the departmentals were withdrawn and their immeasurable influence on standards began--presumably--to fade. Such an assessment would help answer the question, "If a university determines to admit to first year only those students most likely to succeed in the postsecondary programs of their choice, how can it identify those students from among all applicants?"

## 2. METHOD: THE UNIVERSITY RECORDS SURVEY

The University Records Survey was relatively simple to conduct. The information outlined above (regarding family and secondary school background) was requested from the Ontario Universities Application Center for approximately 1500 first year students. Their selection was guided by the fact that we wanted the information resulting from comparisons between their high school marks and their first year grades to be statistically useful for the universities they were attending (the eleven in the Project III study).

For each of the selected students, OUAC file data were requested and data concerning program name and course marks achieved in first year were solicited in the summer of 1976 from

the appropriate university registrar. As it turned out, by the end of the 1975-76 university year, only 1290 students with records containing the information we requested were found to be enrolled in a first year program.

## 3. METHOD: THE SSGD/SSHGD SURVEYS

### 3.1 The Samples

Our starting point in designing the samples for the SSGD/SSHGD Surveys was the intention that the statements we would eventually be able to formulate on the basis of the survey would be applicable to all students in "regular" public secondary schools in Ontario working to qualify, in June 1976, for either a Secondary School Graduation Diploma or a Secondary School Honour Graduation Diploma. The Francophone segment of that population, attending both Francophone and bilingual schools, was to be included in the study, but it was to be dealt with separately.

Hence both Anglophone and Francophone samples had to be large enough so that statistics for those populations could be estimated with reasonable precision from the data the samples provided. On the other hand, they had to be small enough so that data could be collected and analyzed in the very limited amount of time we had, and so that the costs of data collection would not be prohibitive. The two-stage sampling procedure shaped by these constraints is described in detail in Chapter Two, Part A, Section 1 of this report. That description shows how the larger Anglophone sample was framed to include schools varying in size and in situation in the province. Chapter Two, Part A, Section 1 makes clear too the procedures that were used to ensure that the samples of students surveyed in each school were statistically representative. Finally, it shows how time-consuming and discouraging is the task of recruiting subjects for survey: though we aimed to sample 60 Anglophone and 15 Francophone schools, the final count was only Anglophone: 53, Francophone: 14.

## 3.2 The Tests

One day in May, all the students in the province who had been selected for survey wrote some of the standardized tests which had been chosen or developed for the study. The tests dealt with the following subject areas: English, français and anglais, French as a second language, physics, and mathematics. Each test had been approved by a qualified selection committee, whose task it had been to find or develop--in the limited time available--the best instrument they could to test the knowledge and skills accepted as important to their particular subject at the Interface level. The source and nature of each of the approved tests is outlined briefly in Chapter Two, Part A, Section 2; further details about the contents of the tests, the results of their appraisal by Interface teachers "in the field", and technical matters such as their reliability or difficulty or effectiveness in distributing students across a range of scores--these are provided in Appendices A1-A9.

The most important thing for the reader to recognize even at this early point is that the contents of the tests were valid, though not in the sense of being comprehensive in their coverage of the content of the courses the students were taking nor in their coverage of the expected range of knowledge of the students. Rather, test selection committees made it their aim to reject any test or item not relevant in both content and difficulty level to students and teachers at the Interface. And each instrument resulting from their deliberations was approved as valid (with some qualifying comments, of course) by the secondary and postsecondary instructors who appraised the test in their subject area by means of the Test Appraisal Inventory designed specifically to assess that test. The significance of the tests' being valid cannot be exaggerated. Statements about present student achievement levels at the Interface which are based on how SSGD and SSHGD students performed on these tests are only as meaningful as they are--and they are meaningful--because the tests, though not perfect, were valid.

The administration of the tests was extremely complex due to a number of logistic and statistical factors which are explained in Chapter Two, Part A, Section 3. However, by way of introduction and illustration, these are the sorts of considerations that shaped proceedings on May 26:

(a) No student could possibly write all the tests for which he was eligible in a single day; yet each test had to be taken by a sample of students both eligible and representative.

(b) Some tests (English, français and anglais) were to be written by all students--SSGD and SSHGD.

(c) Others (mathematics achievement and physics) were only valid for SSHGD students taking the courses to which these tests were closely tied.

(d) The <u>Test of Arithmetic and Basic Algebra</u>, on the other hand, being a basic test, was to be written by all SSGD students whether or not they were enrolled in mathematics courses.

(e) Certain tests were subdivided and students did not necessarily write all parts; thus, .for example, although all Anglophone students wrote the English test package, some escaped the essay part of it.

(f) Certain tests (physics and mathematics achievement) required two versions: one in English, one in French.

(g) Certain tests (English and français) had two different though equivalent forms, and students wrote either one form, or the other--or both.

Complex, indeed, the "choreography" of the test administration!

Complex too, the procedures for having essays scored and adjusting achieved test scores, so that the results reported here would be "fair," as the students would say; that is, valid and reliable. (These procedures are discussed in Chapter Two, Part A, Section 4, and also in various appendices.)

## 4. FINDINGS

### A. THE SSGD/SSHGD SURVEYS

#### 4.1 Anglophone Students

In answer to the understandable but simplistic question, "How did they do?" two responses are equally immediate: a not enigmatic, "Much as expected," and a further query, "Relative to what?"

It should be made clear right away that support for statements such as "30% of the students wrote Grade A essays!" or "The average mark on the physics test was only 51%!" is nowhere to be found in this report. Levels of achievement are not considered here relative to perfect (100%) levels. Rather, they are examined in relation to one another; the performance of one group of students is measured against that of another group--or several other groups.

In a couple of cases (Grade Thirteen physics and mathematics), the comparisons involve 1976 SSHGD students and Grade Thirteen students of a few years ago. But for the most part comparisons are made among different groups of students within the Project II samples.

How were these groups identified? Firstly, and obviously, by the students' expected qualifications by June, 1976; hence the basic SSGD and SSHGD groupings. Secondly, according to their personal plans for the school year 1976-77. On those bases the following groups were defined:

(a) SSHGD-POSTSEC: containing students planning to enter a postsecondary institution (a university in the majority of cases):

(b) SSHGD-OTHER: containing students with various plans (for work, marriage, travel or a return to secondary school) other than postsecondary study;

(c) SSGD-SEC: containing students planning to return to secondary school, presumably to qualify for their SSHGD;

(d) SSGD-POSTSEC: containing students planning to enter a postsecondary institution (a College of Applied Arts and Technology--CAAT--in the majority of cases) or training program; and

(e) SSGD-OTHER: containing students planning to work, marry, travel, etc.

Although primarily these groups were shaped by the anticipated futures of the students comprising them, analysis of the students' secondary school programs, (summarized in Tables 3.16 to 3.19, and described in Section 1 of Chapter Three, Part A) reveals that to some extent the groups are identifiable too by past and present realities in the secondary school careers of the individuals within them.

For example, the typical SSHGD-POSTSEC student prepared himself for university entrance--how consciously, we cannot measure--by taking 5 advanced level courses in "traditional" academic subjects (i.e. excluding physical education, business, theatre arts, etc.) each year of his high school career. The typical SSHGD-OTHER student acquired fewer credits overall; more specifically, fewer advanced level credits, and fewer "traditional" credits. Students in both SSHGD groups--typically--took one English course a year. As far as their Grade Thirteen level courses were concerned, SSHGD-POSTSEC

students included more mathematics/science in their 1975-76 programs, and SSHGD-OTHER included relatively more history/geography/social science.

A similar pattern is discernible in the programs of the three SSGD groups. Typical SSGD-SEC students, apparently working toward university via Grade Thirteen, accumulated in their four years of secondary school more credits overall, including more advanced credits and more credits in mathematics and in traditional subjects collectively, than did typical representatives of the SSGD groups heading for postsecondary training other than university or directly for employment. Of the three groups, the SSGD-OTHER contains students who acquired the fewest credits overall.

Nothing unexpected here. But these facts are evidence that each defined group brought to the achievement tests not only a different (and somewhat shared) vision of personal future (relative to schooling), but also a different (and somewhat common) academic background, and therefore a different sort of preparation for the tests. Hence the usefulness of the groups' being isolated and--where they took tests in common--their performances being compared.

## 4.2 Achievement test results for Anglophone students

(These summary conclusions regarding student performance on the achievement tests are based on the information which is presented in Tables 3.20 to 3.31, and Figures 3.1 to 3.6, and which is considered at some length in Section 1 of Chapter Three, Part A.) Only in English were Anglophone students in all five of the groups described above tested by means of the same instruments. But in reading comprehension and language achievement, and in essay writing, the performances of all SSGD and SSHGD students can be compared. Not surprisingly, the ranges of results for the five groups overlap quite considerably, but nevertheless, the groups' rank order (from high to low) runs identifiably as

follows: SSHGD-POSTSEC, SSHGD-OTHER, SSGD-SEC, SSGD-POSTSEC, SSGD-OTHER. Surprising perhaps is the fact that the SSGD-SEC group were closer in performance on the subtests for reading comprehension and language achievement to the two SSHGD groups than to the other SSGD groups. Still, these results do provide some evidence (in the difference between the SSGD-SEC group's performance and the performances of both SSHGD groups) that the Grade Thirteen year affects in a positive way the sort of English competence these tests measure.

One instrument, the basic (as opposed to course-related) Test of Arithmetic and Basic Algebra, was written by all Grade Twelve students (and only Grade Twelve students) whether or not they were studying mathematics. Of the three SSGD groups, those returning to high school for Grade Thirteen did best; those leaving school for work did least well.

In the three subject areas (mathematics, French and physics) where tests closely related to Grade Thirteen courses were administered only to SSHGD students taking those courses, test results corroborate the SSHGD-POSTSEC, SSHGD-OTHER rank order that appears in the results for English.

Further, in these three particular tests, group comparisons of an historical or cross-cultural nature are possible. In 1968, 24,000 Grade Thirteen students wrote the same Mathematics Achievement Test as was administered in Project II. The 1976 students (combining SSHGD-POSTSEC and SSHGD-OTHER group) did as well as their predecessors; while the SSHGD-POSTSEC group--taken by itself--did slightly better than the 1968 students. Reasonable stability in mathematics standards seems apparent. (Table 3.26 and Figure 3.4 present the relevant statistics--and are encouraging.)

Table 3.31 and Figure 3.6 are less so. They describe a comparison between the performance of a large sample of Grade Thirteen physics students in 1970 and Project II's SSHGD physics students' performance on the Physics Achievement Test. They

record a serious decline in student achievement in physics between 1970 and the present time. (Explanations for the decline are largely related to the reduction in class hours allotted to the physics course in recent years, and are considered extensively in Chapter Three.)

For a variety of reasons, cross-cultural comparisons for the battery of French tests written by the Anglophone students of Grade Thirteen French are hazardous, though not impossible. No parallel group of Ontario students has taken the tests (which were developed for an international study), and the Project II versions of some subtests were altered slightly from the originals. Still, rough comparisons allow one vague but not meaningless conclusion: 1976 Ontario Grade Thirteen students performed reasonably well in comparison with students in other countries: less well than some, better than others.

## 4.3 Francophone Students

The Francophone students, like their Anglophone counterparts in the study, were divided into groups according to the qualifications they were expected to have earned by June, 1976 and the plans they reported having made for September, 1976. And it is within the framework of those groups that information about the Francophone students' performances on the achievement tests is presented both in Chapter Three, Part A of this report and here in the Summary Chapter. All achievement levels are here viewed relatively; the level of one group is measured against that of another; in these comparisons, the "perfect" level plays no part.

In the summary of findings for Anglophones, five groupings for students were defined: SSHGD-POSTSEC and SSHGD-OTHER; and SSGD-SEC, SSGD-POSTSEC and SSGD-OTHER. These categories, and the definitions of them given a few pages ago, apply to the Francophone sample of students in this discussion of results basically as they applied to the Anglophone sample. However, some descriptive comments about the Francophone groups may be useful

reminders at this point. The Francophone SSHGD-POSTSEC group can be envisioned as--essentially--university-bound; the SSGD-POSTSEC, as CAAT-bound. Most of the SSGD-SEC group can be regarded as likely to spend one more year in secondary school, and then to proceed to university. A strikingly high percentage of the OTHER groups--at both SSHGD and SSGD levels--see themselves doing full-time jobs by September, 1976.

Analysis of student records (regarding credits acquired throughout secondary school careers and specific courses taken in 1975-76) reveals that each of the five groups can also be characterized somewhat by the sort of program taken by a "typical" student within it. For example, the typical SSHGD-POSTSEC student took five courses in "traditional" academic subjects (one of them being français) at the advanced level of difficulty every year from Grade Nine to Grade Thirteen, and in his final year he likely took six SSHGD courses. The typical SSHGD-OTHER student's career was very similar, though he probably acquired slightly fewer credits overall, and--chances are--one or two fewer mathematics credits. Probably too, in 1975-76, he took fewer SSHGD-level courses than his POSTSEC classmate. Typical SSGD-SEC and SSGD-POSTSEC program records resemble one another closely and differ noticeably from typical SSGD-OTHER records in the considerably greater number of advanced level credits they contain, and the slightly greater number of mathematics credits. A common thread running through the records of all five groups is the study of both français and anglais from Grade Nine through to the end of Grade Twelve.

## 4.4 Achievement test results for Francophone students

(Section 2 of Chapter Three, Part A, Tables 3.65 to 3.75 and Figures 3.7 to 3.12 are the sources for these summary conclusions regarding Francophone student performance on the achievement tests.)

Students in all five groups wrote the _Test de compréhension en lecture et de connaissance de la langue (français)_ and the writing test for français, the _Composition écrite_. The groups' rank order on both tests runs (from high to low) as follows: SSHGD-POSTSEC, SSGD-SEC, SSHGD-OTHER, SSGD-POSTSEC, SSGD-OTHER. Interestingly, the two groups containing a majority of students having in mind the goal (either immediate or eventual) of university outperformed the other three. It would seem that the number of years for which français had been studied in secondary school was not the single most determining factor shaping results on these tests; still, the difference between the SSHGD-POSTSEC and the SSGD-SEC performances tells something about the incremental effect of the Grade Thirteen year on the language competences these tests measured.

The _Test de connaissance de la langue (anglais)_ was also written by all five groups of students, and the results at both extremes of the comparison among the five parallel the results on the français tests: SSHGD-POSTSEC students achieved the highest scores; SSGD-OTHER students achieved the lowest. But the performances of the three "middle" groups defy simple ranking.

All SSGD-level students tried the _Test d'arithmétique et d'algèbre de base_. Essentially, the SSGD-SEC students--as a group--did better on the test than the SSGD-POSTSEC and SSGD-OTHER groups did. Yet both SSGD-SEC and SSGD-POSTSEC groups--the two which tended to have more mathematics credits in their typical programs--were represented among the highest scorers.

Test results for the Francophones--like the Anglophone results--were neither uncomplicated nor unexpected.

## 4.5 Variation in Marking Standards

Two questions were central to both Anglophone and Francophone studies. First, "Do marking standards vary from one school to

another?" And then, "If standards do vary, is the variation substantial enough to affect students' academic careers?"

Since the study of marking standard variation was conducted by the same methods in both the Anglophone and Francophone samples of schools, and since the results of the statistical procedures used were, for the most part, parallel for both, a summary description for each of the two variation studies would seem repetitive. Hence, although two separate sections of Chapter Three, Part A deal with the marking standard study, it is outlined here, summarily, in one.

In June, when the final reports for the school year 1975-76 had been prepared, data were collected regarding the marks attained by students who wrote achievement tests in each of the test-related courses they had taken. The achievement test scores themselves provided the basis upon which we compared course marks awarded by different schools and thereby sought information regarding variations in marking standards. Our underlying assumption was simple: similar test performances should be reflected in similar final course marks. (If, exaggerating for illustration, a student in one school who placed at the 50$^{th}$ percentile in the physics test results got a final physics mark of 80%, and another at the same percentile but attending a different school was given only 60%. the situation would imply variation in standards and would certainly merit investigation.)

However, before such comparisons could be made, the statistical ground had to be prepared in three ways. First, it was necessary to obtain statistical evidence that--within each school--test scores correlated positively and substantially with course marks awarded; that--in other words--students who did well on the tests got correspondingly high grades, and students who did poorly on the tests, got correspondingly low grades. As Chapter Three, Part A explains, the appropriate coefficients of correlation were computed and the results assured us of the required course mark-test score correlations within each school.

Second, we needed to "translate" test scores from the language of percentile ranks into the language that teachers used when they reported course marks, that is, the language of percentages. This "translation" was done by a regression analysis procedure described in Chapter Three, Part A, and the resulting percentages were designated the "predicted marks". (The term indicates that these marks were "translated from" or "estimated using" or "predicted by" the achievement test scores; they are distinguished from the "observed marks", which are the marks actually awarded by teachers for test-related courses.)

The third preparatory step for the between-school study was to calculate two marks for every school: an "observed mean mark" and a "predicted mean mark". These were the basic data required for our study of variation in marking standards.

How were these data used? First, for every course for which there was a related test, we investigated the correlation between the predicted mean marks and the observed mean marks for all the schools. (Obviously, high correlation would be a sign of consistent standards--or at least no cause for concern about varying standards--across schools. It would indicate that a school's average performance on an "external" and "universal" achievement test was a good predictor of the average mark awarded internally at that school in the relevant course.)

The results of this correlation procedure were positive for both Anglophone and Francophone samples, but the results for the Anglophones were both the higher and the more stable. Something which cannot be stressed too much is that the findings that emerge from the study of marking standards in Francophone schools are relatively unstable, because of the small number of schools in the sample. Nevertheless, the positive correlations between schools' predicted and observed mean marks bear the following message: in schools where students did poorly on the achievement tests, teachers tended (though the tendency was not statistically "strong") to award marks that were correspondingly low; in schools where students did well on the tests teachers tended

(again, not "strongly") to award correspondingly high marks. The theme "much as expected" appears once again in our findings.

Further correlations were computed using predicted and observed mean marks. And messages here too were not surprising: in both Anglophone and Francophone samples, if the predicted mean mark for a school was relatively low, teachers tended to assign marks somewhat higher than predicted; and if the predicted mean mark was relatively high, they tended to award marks somewhat lower than predicted. All this means is that teachers are sensitive to overall class achievement/ ability, and to the reality that, even in groups of individuals who are academically "hopeless" or in groups composed relentlessly of "geniuses", marks have to be spread, to some degree, over a meaningful range.

A final correlation was done to investigate the consistency with which observed marks differed from predicted marks across courses within a school; presumably consistency here would indicate something about whether "hard" schools were <u>generally</u> hard, that is, hard in most or all subject areas, and "soft" schools were <u>generally</u> easier. For the Francophone sample, no conclusion on this issue is possible; likely because of the small number of schools in the sample, findings here cannot be translated into general statements. In the Anglophone sample, however, there was an observable though weak tendency for the differences between observed and predicted marks--whether small or large--to be consistent in size from course to course within a school. It thus appeared probable that some schools' marking standards were <u>generally</u> closer than others' to the tests' standards.

Finally, the differences between the predicted and the observed marks in each school for each course were subjected to a different kind of analysis, as described in detail in Chapter Three, Part A. The purpose of this procedure was to compare--among schools--the magnitudes of the discrepancies between those two marks (which might be viewed as the average mark a school actually awarded for a course and the average mark

it should have awarded had all other things--including marking standards--been equal). The point of measuring and comparing these discrepancies was to assess the degree to which a student's course marks might be affected by the fact that he attended one school and not another.

Results of this analysis showed greater discrepancies and greater variation in discrepancy among schools in the Francophone sample than among Anglophone schools; yet it is likely that the extent of this variation is due in part to the small size of the sample and the instability of the statistical estimates such a sample can generate. At any rate, the results from the Francophone survey should not be accepted without caution. Nevertheless, the same general conclusion on this issue holds for both Anglophone and Francophone studies: schools vary in the marks they assign, and the variations are great enough to affect a student's standing in the overall mark distribution across the province. They are not so great as to make it worthwhile for a student to change schools in order to raise his marks. (Even for the student who is not particularly academically inclined, the pay-off for a little more effort would outweigh any gains obtainable by changing schools.) But they are great enough to affect a student's postsecondary career so long as universities and other postsecondary institutions select applicants on the basis of marks earned in secondary school. In such competitions, students from schools which award higher marks have a distinct advantage over students from schools which award lower marks.

## 4.6 Achievement Tests as Predictors

As a by-product of the study of marking standard variation, some interesting information was obtained regarding the value of certain of the achievement tests and subtests as predictors of relevant course marks. Details on this subject can be found in Chapter Three, Part A. A brief summary of that information follows here.

*Tests for Anglophones*

A student's scores on the *Writing Test* and on all three subtests within the *Test of Reading Comprehension and Language Achievement* contributed significantly to the prediction of his final English course mark. His writing mark was a slightly more accurate contributor than the others, but less accurate than the four marks combined.

In the battery of tests of French as a second language, both the *Reading Test* and the *Listening Test* were excellent predictors.

Each of the *Mathematics Achievement Test* and the *Physics Achievement Test* predicted Grade Thirteen course marks in the relevant subject about as accurately as they did in 1967.

*Tests for Francophones*

Among the four tests for français (the *Composition écrite* and the three subtests of the *Test de compréhension en lecture et de connaissance de la langue*), different tests and combinations of tests were significant predictors for français courses at different year levels and at different levels of difficulty. This is likely an indication of the variation among courses in the emphasis given to certain language competences.

Within the *Test de connaissance de la langue (anglais)*, two subtests (the reading comprehension multiple-choice test and the writing exercise which required a written commentary) contributed significantly to the prediction of marks in anglais courses at all levels.

## B. THE UNIVERSITY RECORDS SURVEY

The essential purpose of the University Records Survey was to assess the extent to which a student's first year university performance could be predicted from his secondary school marks.

Our sample included students from secondary schools which varied (as we have shown) in the marks they awarded to students performing comparably on achievement tests. Furthermore, these students were pursuing a variety of programs in a variety of universities. Their programs fell into four categories: Humanities/Arts; Social Sciences; Sciences; and Professions. The universities included: Brock, Carleton, Guelph, Lakehead, Laurentian, McMaster, Ottawa, Toronto, Trent, Waterloo, and Windsor. "Everybody knows"--and everyone accepts the fact--that all programs at all universities are not equal in difficulty. Put another way, and illustrated by tabulations reported in Chapter Three, Part B, the means of the average first year marks achieved by students in the survey varied significantly among the eleven universities and among program areas.

What this means, as far as prediction is concerned, is that there is relatively little point in predicting university performance from Grade Thirteen performance alone--out of context. The significance of context has been accepted for as long as there has been concern about prediction. For instance, the Atkinson Study (begun in 1956) and the OISE studies conducted by Khan and his collaborators in 1970 and 1971 took into account, in their own ways, one or both of the contexts of the university a student attended and the program he took there. And when we looked at our correlations between SSHGD and first year marks where consideration was given to those same two factors (universities and programs), we found encouraging results. The evidence indicated that, using his Grade Thirteen average and information about what university he attends and what course he pursues, a student's university performance is as predictable in 1976 as it was when the departmental examinations still measured

his Grade Thirteen achievement and when those examinations had only recently been discontinued.

But, in 1976, an additional contextual factor seemed worth weighing. How, we asked, would the accuracy of prediction be affected by the inclusion of information regarding the secondary school a student attended? Specifically, what would happen to the university mark predicted for a student--on the basis of his Grade Thirteen average, the university he attended and the program he pursued--if allowance was made for the difference between the marking standard of his particular secondary school and the overall Grade Thirteen marking standard of the schools in the survey? This "allowance" was computed and the rather complex results are explained and their significance is discussed in Chapter Three, Part B of this report.

## 5. CONCLUSIONS

Certain popular--or at least widely noised--opinions about the present situation in the secondary schools and at the Interface seem, on the evidence of this study, to be misconceptions. Perhaps this is a suitable place to draw attention to them.

(a) There is public concern that students are graduating from our secondary schools with relatively little training in English (or français) and mathematics.

Although Anglophone students in Grade Twelve and Thirteen vary considerably in the proportion of their program which could be labelled "traditionally academic" and which are taken at the difficulty level labelled "advanced", nevertheless, the vast majority of Anglophone students have taken one English course per year during their high school careers, and similarly, the vast majority of Francophone students at the Interface have earned one credit per year in français.

Further, over 50% of students generally, and a full 70% of those who are university-bound, have taken mathematics every year.

(b) There is some belief that Grade Thirteen achievement levels "just aren't what they used to be." Anglophone SSHGD-level mathematics students did as well on the Mathematics Achievement Test in 1976 as they did on the same test in 1968.

Anglophone SSHGD-level physics students did rather alarmingly less well in 1976 on the Physics Achievement Test than they did in 1970.

(c) Many people believe that marking standards in our secondary schools are in a state of chaos.

The correlational analyses run in the study between secondary school course marks and achievement test scores indicate a situation very far from chaotic. Though statistics for Francophone schools are a good deal less stable than those for Anglophone schools, it appears that teachers are sensitive to the real achievement levels of their students and report these levels on scales which are realistic and meaningful for their class groups.

(d) There is concern that marking standards vary widely from school to school, so that students who are shrewd, if not conscientious, can improve their apparent achievement levels by changing schools, and so that students in some schools have unfair advantages over those in other schools as far as being accepted into certain universities is concerned.

Project II results point to the existence of "hard" and "soft" schools among Anglophone schools in the province. Whether high or low standards are applied

consistently across courses within Francophone schools could not be verified, due to the small number of schools in the Francophone sample. Nevertheless, there is evidence in the results of both surveys that a student's moving from one school to another could indeed affect his relative standing in the provincial distribution of marks for a given course. However, the degree to which his standing would be affected is not so large that he couldn't improve his grade more effectively by simply studying harder.

On the other hand, the degree to which secondary schools vary in the marks they award for comparable performances is substantial enough to affect whether or not a student is accepted into a postsecondary institution, if that institution admits students on a competitive basis and does not control for marking standard variation when considering candidates from a variety of schools.

(e) Many people are uncertain about the need for expanding postsecondary opportunities for Francophone students.

A sizeable proportion of Francophone students at both SSGD and SSHGD levels reported that their plans to leave school for work at the end of the 1975-76 school year were "second choice" plans; that, had a particular postsecondary program been available in French, they would have taken it.

(f) There is considerable concern that, in view of the fact that secondary schools vary in their marking standards and students no longer write standardized achievement tests or entrance examinations, universities have insufficient information on which to base their selection of candidates.

Project II demonstrated that even without making adjustments to control for variation in marking standards, predictions regarding applicants' performances in university which are made on the basis of raw school marks are just as accurate as predictions made in the past on the basis of departmental examinations results.

## 6. A FINAL WORD

Research of this nature is not unlike archaeology. Neither--in spite of the romantic aura surrounding the term "archaeology"--is really a field for drama. The essence of both is a plan of operation both imaginative and utterly realistic, supported by scrupulous and meticulous attention to detail. Data--like fragments of pottery and bone--have to be uncovered, "cleaned up," appropriately related to other pieces, recorded, interpreted. No one would expect an archaeologist to sacrifice thoroughness for speed. Unfortunately, the researcher is often asked to extract "the facts" from his fragments before he has been able to obtain all the data he regards as important for "the whole story", or before he can investigate his data from all the angles he considers illuminating. This study suffers--or at least we who have worked on it suffer-- from a sense of the incomplete. It is highly unlikely that, had the time limitations for Project II been less severe, the conclusions drawn from its findings would have been different. But the conclusions could probably have been both accepted and acted upon with less caution, had investigations been less rushed. We are earnest in our hope that research on the matters studied here will be pursued, and that the data accumulated will be thoroughly and imaginatively examined.

CHAPTER ONE

INTRODUCTION

## 1. BACKGROUND

"Higher education in Canada, as in most countries of the Western World, is undergoing a period of severe stress and trial. Demands unprecedented in strength and variety are being made upon our institutions of higher learning." It was with these words, penned 19 years ago, that R.W.B. Jackson began his preface to the first report emanating from the Atkinson Study of Utilization of Student Resources (Fleming, 1957a).

In the winter of 1956, when the first data were collected for the Atkinson Study, higher education--in this context, secondary and postsecondary education--in Ontario faced the challenge of expansion. Statistics regarding the present situation in Ontario are not readily available, but the figures for the period 1956-1974 give a clear impression of the extent of the challenge faced by educators two decades ago. Between 1956 and 1974 the population of Ontario grew 50 per cent, from approximately 5.4 million to approximately 8.1 million people (1). Over the same period of time, the percentage increase in several educational indicators was very much larger than 50 per cent. The number of students qualifying for the Secondary School Honour Graduation Diploma (SSHGD) in 1956 was 6062, in 1974 it was 40710 (2). In 1956, the students in Grade Thirteen represented 21 per cent of all those who had entered Grade Nine four years earlier; by 1974 the corresponding percentage was 38 (3). To meet the increased demand for secondary education, the secondary school system in the province was expanded from 383

institutions in 1956 to 611 by 1974 (4). In postsecondary institutions there was commensurate growth reflected in the fact that, whereas in the academic year 1955-56 there were 22,642 graduate and undergraduate students enrolled in full-time study at Ontario universities, affiliated colleges and Ryerson (5), in the academic year 1974-75 the number was more than six times larger at 149,800 (6).

Over the decades since 1956, change in public education has not been limited to growth in numbers. An example of another kind of change, one that can only be described as highly significant, was the discontinuation in 1967 of the "departmental" examinations for SSHGD students. The abolition of these examinations opened the way for increased professional responsibility, revitalizing flexibility in curriculum design, and methods of evaluation less administratively cumbersome, artificial and anxiety-provoking than the departmentals had become. But, along with the disappearance of these examinations went the homogenizing influence they exercised on the secondary curriculum and the common standard of achievement they established for the whole of the province. In the current post-examination period, it is not possible to assume that two students from different schools, both possessing an SSHGD and having credit in SSHGD courses of the same name, did in fact study the same things. Nor can it be assumed that students who attain the same average mark in their SSHGD courses have in fact met the same standard of excellence. The immediate and dramatic increase in the number of students with averages of 60 per cent or higher that followed the discontinuation of the departmental examinations has been documented by Watson and Quazi (1969, p.52). Over the five years ending in 1967, the proportion of Grade Thirteen students who averaged 60 marks or more on their SSHGD courses varied from .55 to .47. In 1968, the first year after the discontinuation of the departmental examinations, the proportion jumped to .69. Although this evidence speaks only about a general lowering of standards, it also sparks concern about whether or not standards slipped more in some schools than in others.

Another dramatic change that took place in secondary school education through the late 'sixties and early 'seventies was the introduction of the credit system. It is impossible to offer a brief description of just what impact this change has had on secondary schooling. Part of the difficulty stems from the fact that "going on the credit system" has meant different things in different schools (Laxer, Traub and Wayne, 1974). Nevertheless, one generalization bears mention here: the implementation of the credit system has tended to reduce the number of courses that are required as the core of any program. The student who wants an SSHGD has more electives and fewer required courses than his 1956 predecessor had. The same is true of the student working for a Secondary School Graduation Diploma (SSGD), whether or not he plans to specialize in arts, business or technology. Due to the flexibility of the present system, not only may standards vary from school to school, but also, even within a single school, graduates may not all be required to meet a common standard of excellence.

Two decades after the commencement of work on the Atkinson Study, it is possible to echo Jackson and say that secondary and postsecondary education in Ontario are undergoing a period of severe stress and trial. As would be expected in view of the changes that have occurred since 1956, the stresses and trials of today are different from those of the mid 'fifties. Secondary and postsecondary education are no longer looking forward to a period of expansion when budgets grow at phenomenal rates. Instead, education at the secondary and postsecondary levels is in a period of restraint when budgets, if they don't decrease, seem not to increase at the same rate that the value of the dollar declines.

Aside from fiscal problems, secondary and postsecondary education face expressions of concern about standards and quality and duplication of effort. The feeling exists, in the absence of an external examination system such as the SSHGD departmentals, that it is impossible to monitor the quality of work done for the SSGD and the SSHGD. (The field of evaluation seems to many like uncharted territory; old maps are unreliable; new compasses

disagree. Yet evaluating must go on. So, for many markers, anxiety runs high, and many surrender under pressure from time to time with a despairing, "What's the difference?" In such a situation, real confidence in assessment runs low. So does morale.) Further, it is widely believed that the increased freedom of course choice conferred on students by the credit system has been accompanied by a tendency to walk the "low road" to an SSGD or an SSHGD, the road cobbled with easy courses. Whether as a consequence of the disappearance of departmental examinations and the introduction of the credit system, or as a consequence of the increased percentage of the population being admitted to postsecondary education, or as a consequence of something else, many of the Colleges of Applied Arts and Technology and the universities find it necessary in 1976 to provide remedial courses in English and mathematics.

## 2. PURPOSE

Secondary-Postsecondary Interface Project II (Project II) was initiated as a part of a review of those government policies which affect the ways in which secondary and postsecondary programs are related and coordinated, the progress of students through these programs, and the criteria upon which postsecondary admissions are based. More specifically, the purpose of Project II was to describe and analyze pertinent characteristics of students in the final two years of secondary school and the first year of university. The study was designed to respond to the following five clusters of questions:

(a) What type of person is completing the work needed to earn a Secondary School Graduation Diploma (SSGD) or a Secondary School Honour Graduation Diploma (SSHGD)? What is his family background and his language experience, what type of secondary school did he attend, what program of courses did he take, how well did he perform in school, and what are his plans for

the immediate future and his occupational goals in the long term?

(b) Of the characteristics used to describe the secondary school graduate in 1976--family background, language experience, type of secondary school attended, program of courses taken, plans for the immediate future and long-term occupational goals-- which are most highly correlated with scholastic achievement in secondary school? Is the level of prediction possible in 1976 different from the level realized a decade or more ago?

(c) Do marking standards differ from one secondary school to another? Are differences in standards, if any, related to differences in the characteristics of the secondary schools and of the students attending the schools?

(d) What type of person is completing the first year of a university undergraduate program? What is his age, country of birth, language experience, level of achievement in secondary school, university program, and level of achievement in university?

(e) Of the characteristics used to describe first year university students--age, country of birth, language experience, level of achievement in secondary school, and university program-- which are most highly correlated with first year university achievement? Is the level of prediction possible in 1976 different from the level realized a decade or more ago?

## 3. RELATED ONTARIO STUDIES

Research on these questions continues a tradition of work in Ontario that is marked most notably by three efforts. The first is the aforementioned Atkinson Study. Among the reasons Fleming (1957b) offers for this study having been undertaken are two that link it directly to Project II: (1) to "... discover the combinations of traits and abilities required for success in various educational courses and occupations" and (2) to improve "...university admission practices." (Fleming, 1957b, pp.4-5). The Atkinson Study was longitudinal in design. All but three or four per cent of the Ontario students who in January 1956 were expected to qualify for an SSHGD in June of that year were administered a questionnaire, the Scholastic Aptitude Test (SAT), the School and College Ability Test (SCAT), and the Nelson-Denny Reading Test. In addition, a questionnaire on each student was completed by a group of the student's teachers, and the Kuder Preference Record - Personnel, the Brown-Holtzman Survey of Study Habits and Attitudes and the Cooperative English Test were administered to subsamples of the students. These "Atkinson" students were then followed for a period of time, during which their success in postsecondary education or in employment was measured and recorded. Over the years from 1957 to 1965 twelve reports and four supplementary reports based on the information that had been collected were published. A number of these reports provide information on SSHGD students and the prediction of university success, information that lends a valuable historical perspective to the results turned up in Secondary-Postsecondary Interface Project II.

A successor to the Atkinson Study was the Carnegie Study of Identification and Utilization of Talent in High School and College. This too was longitudinal in design, but unlike the Atkinson Study which followed students from Grade Thirteen into university and employment, the Carnegie Study followed students from Grade Nine through to Grade Twelve. Of the eight bulletins emanating from this project over the years 1960 to 1964, only the final report, entitled A Preliminary Look at the Carnegie

Students in Grade 12 in Ontario Schools (Brehaut, 1964), is about students at a level of concern to Interface Project II.

The third research effort that is clearly a predecessor of Project II was associated with two admission testing programs, one called the Ontario Tests for Admission to College and University (OACU), the other called the Service for Admission to College and University (SACU). The OACU program consisted of objectively scored tests of verbal and quantitative aptitude, English language achievement, mathematics achievement and physics achievement. These four tests were designed for Grade Thirteen students and were administered first in 1967, the final year of the SSHGD departmental examinations. The OACU tests were intended for use by universities in judging the relative merits of different applicants. The mathematics and physics achievement tests were administered annually for four years, at which time financial support for them was withdrawn and they were discontinued. The OACU aptitude and language achievement tests were adopted in 1969 by SACU for administration across Canada to English-speaking applicants to university. SACU was disbanded in 1974 by which time all regularly scheduled administrations of the aptitude and language achievement tests had ceased.

The research effort that was associated with the OACU and SACU programs, and that relates to Project II, was mounted by OISE under the direction of S.B. Khan, and is referred to hereafter as the OISE Study. The basic purpose of this work was to correlate OACU and SACU scores with Grade Thirteen and university marks. From 1967 to 1971, six reports of correlational evidence were prepared and published.

Generally, both the Atkinson Study and the OISE Study confirmed the high predictive value of both the Grade Thirteen external examinations and the Grade Thirteen teachers' marks. Standardized tests appeared able to contribute further details of varying usefulness to either basic Grade Thirteen picture, but seemed capable of replacing neither.

However, before these findings are taken as generalizable to the current situation, important qualifications have to be noted. First, these studies were conducted at a time when the external examinations or a clear memory of them shaped teachers' marks to a degree no longer possible. Second, although standardized achievement tests appeared more valuable as predictors than standardized tests of aptitude, yet SACU achievement test scores could not in fact be validly tested for predictability because the tests' period of utilization was too short. Thus past studies throw inadequate light on current evaluation standards and alternative methods of measuring achievement.

## 4. OUTLINE OF REPORT

The chapters that follow provide a description of the methods --instruments and procedures--used to collect and analyze the data for Secondary-Postsecondary Interface Project II (Chapter Two), a report of the results that were obtained (Chapter Three), and a summary statement in which conclusions are highlighted and limitations are noted (Chapter Four). During the course of the report of results offered in Chapter Three, reference is made to those findings from the Atkinson and OISE studies that provide a basis for comparing the present with the past.

## FOOTNOTES

1. The 1956 population figure was taken from Table 1, p.7 of the following source: Statistics Canada. Canadian Statistical Review: Historical Summary Catalogue 11-505 Occasional, 1970. The 1974 population figure was obtained by averaging the four quarterly figures given in Table 1, p.24 of the following source: Statistics Canada. Canadian Statistical Review. Publication No. 11-003E, Volume 51, No. 5, 1976.

2. The 1956 figure was taken from p. S95 of the following source: Ontario Department of Education, Report of the Minister, 1956. The 1974 figure was taken from p.72 of the following source: Ontario Ministry of Education. Education Statistics Ontario, 1974.

3. For the 1956 percentage, see p. S98 of: Ontario Department of Education, Report of the Minister, 1956. For the 1974 figure, see p. 17 of: Ontario Ministry of Education, Education Statistics Ontario, 1974.

4. The 1956 number is given on p. S91 of: Ontario Department of Education: Report of the Minister, 1956. The 1974 figure is given on p.12 of Ontario Ministry of Education, Educational Statistics Ontario, 1974.

5. The number for 1955-56 is the total of full-time undergraduate students (excluding normal school students and nurses studying for an RN) and graduate students at Ontario universities during 1955-56 as given in Tables 15 (p.34) and 16 (p.35) of Dominion Bureau of Statistics, Survey of Higher Education, Catalogue 81-815, August 1963.

6. This is the full-time enrollment in 1974-75 in 21 Ontario institutions classified as universities as reported in Table 3, p.43 of Statistics Canada. Advance Statistics of Education, Catalogue 81-220, 1975-76.

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# CHAPTER TWO

# METHOD

## PART A: SSGD/SSHGD SURVEYS

### 1. SAMPLING DESIGN

#### 1.1 Defining the Population

A definition of the SSGD and SSHGD population to be surveyed was developed as follows. Initially, the populations were taken to consist of all those Ontario secondary school students enrolled during 1975-76 in courses which, if successfully completed, would qualify them for either a Secondary School Graduation Diploma (SSGD) or a Secondary School Honour Graduation Diploma (SSHGD) in June 1976. These basic definitions were then modified by the exclusion of all SSGD/SSHGD students attending private schools, special vocational schools, hospital schools, schools for the deaf and blind, the YMCA school and "alternative" schools, such as SEED. Further, in order to meet the requirement of the project specifications that Anglophone students be studied separately from Francophone students, an additional modification was made: both the SSGD and SSHGD populations were divided into two parts, one part consisting of Anglophone students, the other of Francophone students. Anglophone and Francophone students were differentiated by language of instruction. Thus, for example, Anglophone students were taken to be all those who attended secondary schools in which the language of instruction, aside from that used in French and foreign language courses, was English.

A number of secondary schools in the Province of Ontario are bilingual and offer instruction in both of Canada's official languages. The decision was taken to ignore the Anglophone students attending bilingual schools and consider only their Francophone students. The main reason for this decision was practicality; by treating bilingual schools as contributors of Francophone students exclusively, only one mechanism for collecting survey data had to be established in a bilingual school. An effect of this decision was the removal of a number of students from the Anglophone population to be surveyed. However, information contained in the reports filed by secondary school principals in September 1975 with the Ministry of Education indicate that less than 1.5 per cent of Anglophone SSGD and SSHGD students were excluded by this decision.

The distinction between Francophone and Anglophone is difficult to make for some students who attend bilingual schools. A student at such a school may be instructed in English in some courses, e.g. science and mathematics, and in French in other courses, e.g. history and geography. For the purposes of reporting to the Ministry of Education, these students are classified as either Francophone or Anglophone. It was this classification, with its inevitable element of arbitrariness, that was used to differentiate Anglophone and Francophone students in bilingual schools.

The final definitions of the populations that were surveyed are as follows:

Anglophone SSGD/SSHGD Population--all Ontario secondary school students attending schools in which the language of instruction is English and taking courses which, if successfully completed, would qualify them in June, 1976, for the SSGD/SSHGD.

Francophone SSGD/SSHGD Population--all Ontario secondary school students attending schools in which the language of instruction is French (or attending bilingual schools and

classified by these schools as receiving their instruction in French), and taking courses which, if successfully completed, would qualify them in June, 1976, for the SSGD/SSHGD.

## 1.2 Primary Sampling

The SSGD/SSHGD surveys were conducted on probability samples drawn from each population. The sampling was done in two stages, hence the samples are referred to as two-stage samples. For each population, the primary sampling unit was the school. The secondary sampling involved students within schools.

Primary sampling units for the Anglophone SSGD/SSHGD populations were stratified on the basis of region of the province and size. Seven regional strata were defined as follows:

(a) Metropolitan Toronto (excluding Mississauga);

(b) Hamilton (Hamilton was treated as a separate region because it is unique within the province for having separate schools for Grade Thirteen students);

(c) Northern Ontario (defined as those regions of the province designated Northwestern, Midnorthern and Northeastern by the Ministry of Education);

(d) Urban Western Ontario (defined as any city, excepting Hamilton, over 50,000 population in the regions designated Niagara, Western and Midwestern by the Ministry of Education);

(e) Urban Eastern Ontario (defined as any city over 50,000 population in the regions designated Ottawa Valley, Eastern, and Central, excluding Metropolitan Toronto and including Mississauga);

(f) Rural Western Ontario (defined as the remainder of the regions defining Western Ontario - see (d) above);

(g) Rural Eastern Ontario (defined as the remainder of the regions defining Eastern Ontario - see (e) above).

With the exception of Hamilton, the Anglophone secondary schools in each region were divided into two or three substrata on the basis of size. (Size for this purpose was defined as the number of SSGD and SSHGD students attending the school.) The number of substrata for size varied from region to region, depending on the number of schools and the degree of variation in school sizes in the region. The schools in Hamilton were divided into two substrata on the basis of school type; one substratum consisted of the schools for Grade Thirteen students, the other of the schools for students in Grades Nine to Twelve.

There was no explicit stratification or substratification by size or region for the Francophone sample.

The total number of schools to be sampled and the numbers of Francophone and Anglophone schools which would make up that total were determined only after consideration had been given to the practical matters of the cost of data collection and the time available for data collection and analysis, and to the theoretical matter of the precision with which various statistics could be estimated from the data. Consideration of the limits imposed by practical matters led to the decision to sample 75 schools in total. Consideration of the theoretical matter of precision led to the decision to sample 60 Anglophone schools and 15 Francophone schools; the proportion of Francophone schools in the sample (1/5) was made higher than the corresponding proportion in the population of Ontario secondary schools (less than 8/100) in order to achieve a higher level of precision for the results on Francophone schools than would be possible had they been sampled in proportion to their frequency. (Precision in two-stage samples of the kind drawn in this study is a function of both the number

of primary units or schools included in the sample and the number of students sampled from each primary unit.)

Once the number of Anglophone schools had been set at 60, the number of schools to be drawn from each substratum could be established. The minimum number of such schools was one; the maximum was six. The number assigned to each substratum represented (as a fraction of 60) the fraction of the total population of SSGD and SSHGD students (reported by principals to be attending Anglophone schools in September, 1975) contained within that substratum. For example, a substratum containing one tenth of all the SSGD and SSHGD students reported in September, 1975, as attending Anglophone schools would contribute 6 schools to the total sample of 60 Anglophone schools.

In the final selection of schools within stratum (Francophone schools) or substratum (size-within-region for Anglophone schools), the sampling was done with probability of selection proportional to size. That is, the larger schools, in terms of total number of SSHGD or SSGD students, had a higher probability of being included in the sample. This would be compensated for by drawing a constant number of students per selected school (SSGD) or by weighting in the analysis (SSHGD). Outside of Hamilton, a further technique was employed to increase the precision of the sample: within each stratum or substratum, the potential primary sampling units were ordered from low to high on SSHGD/SSGD ratio and the sampling was done systematically across that order with a random start. This insured that a balanced mixture of schools with low and high ratios would be included. (This technique was an alternative to stratification by the ratio.) Control and balance on the SSHGD/SSGD ratio was important partly because the sample of schools was to be used for both the SSGD and SSHGD samples and partly because the ratio is a pretty good indicator of the degree of academic orientation of the students and programs of a school.

## 1.3 Recruiting the Primary Sample

Formal channels of communication were used in an effort to enlist the participation of the schools drawn in the sampling of primary units. The Director of the Board of Education for a chosen school was asked for permission to contact the school principal. When permission was received, the principal was contacted and, after the nature and purpose of the study had been explained to him, was asked whether or not his school would participate in the study.

Of the 75 schools drawn initially, 54 agreed to participate. The others declined for one of two main reasons.

(a) The teachers in the school either were on strike at the time contact was made or had been on strike earlier in the year. Reasons related to the strike and its effects were given for not participating, e.g., participation would further curtail an already abbreviated school year and this would be undesirable in the view of the public, the media and/or the teachers.

(b) The school had already participated in one or more research projects during the school year and the opinion of the principal and his advisors was that further participation in research projects would have a detrimental effect on the school.

When a school declined to participate, a concerted effort was made to replace it with another from the same group of schools as that from which the original institution had been chosen. When a first replacement declined for either of the reasons noted earlier or because the time between the request to participate and the day of testing was judged by school personnel to be too short to allow for adequate preparation, a second replacement was drawn. The process of endeavouring to replace schools continued until the week before the tests were administered.

It was not possible to achieve a full sample of 75 schools despite the very considerable effort devoted to recruitment. The region in which most difficulty was experienced was Metropolitan Toronto. Most of the problems encountered there arose as effects of the teacher strike that had occurred earlier in the year. In the end, it was possible to recruit only 53 Anglophone schools and 14 Francophone schools. A summary of the primary sampling and recruiting is given in Table 2.1.

## 1.4 Secondary Sampling

Initially, the plan was to draw a sample of 50 SSGD and 50 SSHGD students from each secondary school selected in the primary sampling. These numbers were chosen having regard for practical considerations--the time required to collect and process the data on individual students and the costs associated with collecting and processing the data--as well as a theoretical consideration--the need for precision in statistical estimation.

This plan was modified in two ways, one major, the other minor. The major modification concerned the SSHGD sample. It was decided that all the SSHGD students in a school should be included in the study. The main argument for this decision was that school principals would not need to schedule classes for some SSHGD students and test sessions for others during the day when testing was being done in the school. It was hoped that this would make the administration of the tests easier and, as a consequence, increase the willingness of the principal and teachers to participate in the study. An additional argument for having the involvement of all SSHGD students was that this would result in the accumulation of a file of data on a large enough number of students to allow for the possibility of follow-up studies of the relation between the secondary and postsecondary performance of these students.

The minor modification concerned the plan to test only 50 SSGD students. It was decided that all the SSGD students in schools having 70 or fewer such students would be included in the sample. In schools having more than 70 SSGD students, a stratified random sample of 50 students was drawn. The stratification variables were sex and enrollment in mathematics and language courses. The mathematics variable had three categories: (i) enrollment in the Grade Twelve foundations mathematics course; (ii) enrollment in the Grade Twelve applications mathematics course; (iii) other (including students not enrolled in any mathematics courses plus those enrolled in a lower level mathematics course). Information about enrollment in mathematics courses was obtained from class lists supplied by the school. The language variable had two levels: (i) enrollment in some language course, and (ii) other. For each school in the study, a crosstabulation was made of the sex/mathematics/language stratification, and the stratification was then collapsed as necessary to get a set of strata which had reasonable numbers of students. From each stratum, a number of students were drawn at random. This number was the same proportion of 50 that the number of students in the stratum was of the total number of SSGD students in the school.

## 1.5 Assigning Students to Tests

The decision was taken early in the design of the study that all the data from students would be collected in a single school day. This was done in an effort to minimize the amount of disruption that the study would cause in participating schools. An important consequence of this decision was that there was insufficient time for all the SSHGD and all the Francophone SSGD students to write all the tests they were eligible to write. Random sampling was used to assign students to the various tests. For SSGD students, this sampling was done paying attention to the stratifying variables that were used to select the sample of 50 involved in the testing. For the SSHGD students, sampling for the purpose of assigning students to tests was done paying attention to the sex

of the student and the Grade Thirteen courses being taken. It was necessary to attend to the courses of the SSHGD students since several of the tests for these students were course-related. This was not the case for the tests administered to SSGD students. (Further details about the number and nature of the tests and about the assignment of students to tests are provided later in this chapter of the report.)

## 2. INSTRUMENTATION

### 2.1 General Information

The first task in the area of instrumentation was to select or develop suitable tests in the subject areas under examination. For this purpose, five test selection committees were established, composed of secondary school teachers, community college and university teachers, and OISE personnel. The committees dealt respectively with the areas of: English; French as a second language; français and anglais; physics; and mathematics.

Because of severe time limitations, in most cases it was not possible to develop and pretest new tests. Consequently some already existing tests were used in their original form, and some tests were composed of parts of already existing tests.

Other instruments developed were a Student Handbook explaining the general purpose of the project and the specific nature of the tests to be written; a Student Questionnaire designed to elicit background information on students; Test Appraisal Inventories for all the tests, to be completed by secondary and postsecondary instructors; and forms for the collection of file data on the students from secondary school records.

## 2.2 The English Tests

The English committee decided that the same instruments should be used for testing English at both SSGD and SSHGD levels. A battery of three tests was developed.

The Writing Test required students to write, in 1-1/4 hours, an expository essay on any of eight given topics chosen to give the students a broad range of subjects suitable for this mode of writing.

The remaining two tests were parallel forms of a test called the Reading Comprehension and Language Achievement Test (English). Parts of this test were drawn from each of the Canadian Scholastic Aptitude Test (CSAT), 1973; the Canadian Test of English Language (CTEL); and the Canadian English Language Achievement Test (CELAT), 1970. The test is described in Table 2.2.

## 2.3 The Tests of French as a Second Language

The tests chosen for French as a second language were the battery of four tests used in the International Education Achievement Study for Population IV (defined as "all students in the pre-university year grade in full-time schooling who are currently studying French and who have studied it for at least two years before the present academic year"). The battery contains a Reading Test, a Listening Test, a Writing Test and a Speaking Test. These are described in Table 2.3.

## 2.4 The Français Tests

As for English, three tests were developed and used at both SSGD and SSHGD levels.

The *Test de composition écrite* was a direct translation of the English *Writing Test*.

The remaining two test forms were parallel forms of the *Test de compréhension en lecture et de connaissance de la langue (français)*, each requiring 40 minutes to complete. The test consisted of sections of the *Test de français, langue d'enseignement* (TFLE). It is described in Table 2.4.

## 2.5 The Test of English as a Second Language

The *Test de connaissance de la langue (anglais)* was used at both the SSGD and SSHGD levels. It consisted of two parts, and required 75 minutes to complete.

Part I was a reading comprehension test, which had originally formed Part III of the *Michigan Test of English Language Proficiency, Form A*. It contained four short reading comprehension passages, each followed by five questions about the passage.

Part II, *Aptitudes à l'expression écrite*, presented the students with a more lengthy passage, argumentative in nature. They were required to write a 100-150 word summary of the author's argument, and then briefly to give their own opinion on the topic discussed.

## 2.6 The Physics Test

The *Physics Achievement Test* had originally appeared as the *Ontario Physics Achievement Test* (OPAT) for 1970. It was translated into French for the study as the *Test de rendement en physique*. The test required 90 minutes to complete, and consisted of 60 items, covering all but the last section of the Honour level physics course (Electricity and Atomic Structure).

## 2.7 The Mathematics Test

The test used at the SSHGD level as the Mathematics Achievement Test had originally appeared as the Ontario Mathematics Achievement Test (OMAT) for 1968. It was translated into French as the Test de rendement en mathématiques. The test contained 36 items and required one hour to complete. It provided good coverage of the relations and functions course, and less thorough coverage of the calculus course. The committee regretted that it was not possible to find an existing test or part of a test that provided even sketchy coverage of the algebra course.

At the SSGD level, a new test was constructed as the Test of Arithmetic and Basic Algebra, and translated into French as the Test d'arithmétique et d'algèbre de base. This test was not specifically tied to SSGD level mathematics courses, but was rather, as the name suggests, a test of basic arithmetic and algebraic skills; the range of difficulty was from simple arithmetic to the solution of a quadratic equation by formula. The test contained 35 items to be completed in one hour.

## 2.8 The Student Handbook

The Student Handbook was to be given to study participants the day before the tests were administered. Designed to reduce confusion and anxiety, it contained a brief explanation of the Interface Study and its purpose, followed by detailed descriptions of the types of questions which would be encountered on the various tests. Sample questions--with answers--were included.

## 2.9 The Student Questionnaire

Background information on the participants in the study was elicited through the Student Questionnaire, developed in English and translated into French as the Questionnaire de l'étudiant. The areas explored were: age; sex; language of student and parents;

country of birth of student and parents; education of parents; occupations of parents; educational and career plans of student. The questionnaire required approximately 30 minutes for completion.

## 2.10 The Test Appraisal Inventories

For each test or battery of tests used in the study, Test Appraisal Inventories were developed (in the French versions, Test-inventaires estimatifs). The general purpose of these inventories was to invite comment from both secondary and postsecondary teachers on the subjects under study as to the suitability and relevance of the tests to the secondary program and to postsecondary expectations of the achievement of incoming students. Both secondary and postsecondary versions of the inventories were developed and, in the case of common tests, both English-language and French-language versions of each.

The format of the inventories varied somewhat from subject to subject. The Physics Achievement Test, the Mathematics Achievement Test and the Test of Arithmetic and Basic Algebra lent themselves to a simple formula. Secondary school teachers were asked to examine each test item, and to classify the content of each under the appropriate category from Table 2.5 (with a brief explanation if the item were classified C or D).

Postsecondary teachers were similarly asked to classify the content of each item according to Table 2.6 below (with a brief explanation if the item were classified C).

The tests of first and second language did not lend themselves easily to this type of item-by-item examination. Although certain sections of the Tests of French as a Second Language were examined in the same way as the physics and mathematics tests, for the most part the questions on the Test Appraisal Inventories for the language tests were of a much more general nature, asking for various sorts of assessments of whole

test sections or groups of items (for example, assessments of difficulty levels or of the suitability of the content of reading comprehension passages). A further difference in the *Test Appraisal Inventory* for the *Test de connaissance de la langue (anglais)* was that, at the postsecondary level, instructors were not asked to examine the test in the context of first year English courses. Rather, they were asked to look at the test in terms of its suitability as a measuring instrument for those language skills necessary for a student commencing postsecondary education in an English- language institution, whatever that student's field of study.

### 2.11 The Program Data Forms

For the purpose of collecting data from secondary school files on a subsample of students involved in the study, a Program Data Form was generated using the computer. The form was designed to provide, when completed, the number of each student's total secondary school credits; the number of these credits at each of the advanced and general levels; and a list of all SSGD level courses or SSHGD courses (depending on the level of the student) taken during the 1975-1976 school year, along with the student's final mark in each course.

## 3. PROCEDURES

### 3.1 The Administrative Plan

The plan for collecting *Student Questionnaire* and test data was formulated bearing in mind the constraint that these instruments had to be administered in a single school day. The plan called for each participating school to schedule six test sessions, three in the morning and three in the afternoon. The sessions, lettered A to F, and the instruments to be administered in each are listed in Tables 2.7 (Anglophone) and 2.8 (Francophone). Session A in

both Anglophone and Francophone schools and session F in Anglophone schools were divided into subsessions. The reasons for this are as follows:

(a) The instruments administered in subsessions A1 and A2 were identical. That is, both forms of the _Test of Reading Comprehension and Language Achievement_ were administered in each subsession. Subsessions were necessary so that information about the level of performance expected on each form of the test could be obtained and, further, the level of performance of those students who wrote only one form of the test could be equated with the level of performance of those who wrote both forms.

(b) Session F was for the administration of the _Tests of French as a Second Language_ in the Anglophone schools. This session was divided into three subsessions. The _Reading Test_ and the _Listening Test_ were both administered in the first subsession (F1). The _Writing_ and the _Speaking Tests_ were administered in the remaining two subsessions (F2 and F3 respectively). All Anglophone students assigned to Session F were to write the _Reading Test_. Then, assuming more than four students were assigned to Session F, four students were to leave subsession F1 before the _Listening Test_ began, two to attend the subsession for the _Writing Test_ and two to attend the subsession for the _Speaking Test_. If four or fewer students were assigned to Session F, then--where possible--one student was assigned to the _Writing Test_ (F2) and one to the _Speaking Test_ (F3), leaving at least one to complete the _Listening Test_ (of F1). But if there were insufficient students in Session F to allow one to complete each of the three subsessions, then none was assigned to either F2 or F3. In such schools data was collected for Subsession F1 only. (In several schools subsession F1 was scheduled on a different day from subsessions F2 and

F3 for various administrative reasons, e.g., unavailability of staff to administer the tests; unavailability of sufficient tape recorders to administer both the Listening and the Speaking Tests at the same time.) The number of students assigned to the Writing Test and Speaking Test was purposely made small because they were time-consuming and costly both to administer and to score.

Students were assigned to sessions as follows: All the SSGD students to be tested in an Anglophone school were assigned to one of morning Sessions A and B and to afternoon Session E. The distribution of SSGD students between the morning sessions was done at random, subject to the constraint that 24 SSGD students would be assigned to Session B.

The assignment of SSGD students in Francophone schools was done in the same way for morning sessions. In the afternoon, Francophone SSGD students were assigned to both Sessions E and F. This was done to assess their competence in English as well as mathematics. The assignment of Francophone SSGD students to Sessions E and F was done at random subject to the constraint that not more than 20 students should be assigned to Session F.

SSHGD students in both Anglophone and Francophone schools were assigned to morning Sessions A, B or C and to afternoon Sessions D or F. In Anglophone schools, only students enrolled in an SSHGD level course in physics were assigned to Session C; only students enrolled in two SSHGD level mathematics courses, one in calculus or its equivalent and the other in functions and relations or its equivalent were assigned to Session D; and only students enrolled in an SSHGD level French courses were assigned to Session F. The assignment of Francophone SSHGD students to sessions was similarly constrained, except for Session F, where selection was on students studying English or Anglais.

Not all SSHGD students, whether Anglophone or Francophone, who were eligible for Session C were assigned to it. Rather, they were represented also in Sessions A and B. Also, SSHGD students eligible for both Sessions D and F in the afternoon were randomly and equally divided between the two sessions.

All SSHGD students not eligible for Session C in the morning were divided among Sessions A and B. This assignment was made subject to the constraint that not more than 24 SSHGD students would be assigned to Session B.

The above description of the assignment of students to tests is incomplete in one, critical aspect. At each possible step in the assignment process, the randomization was constrained according to the sex, mathematics courses taken, and language courses taken by the students. The sex and course information obtained for the eligible students was crosstabulated, small cells in the result were combined, and the resulting stratification was used to constrain the randomization. For example, this insured that males and females were represented in proper proportions among the students assigned to write essays, or among the students assigned to write French from among those eligible to write either mathematics or French. The stratification used in the randomizations was similar, in the case of SSGD, to that used in the original selection of the 50 students for the study, though the pattern of collapsing was specific to each randomization. The SSHGD stratifications were based on a similar sex by mathematics courses by language courses stratification, but the mathematics stratification in SSHGD had only two levels.

### 3.2 Informing Chief Proctors

The administrative plan was complex and its successful implementation depended on the cooperation and understanding of the teaching staff in each school. Administrative arrangements within each school were made by a member of the school staff who was designated the "Chief Proctor". In order that these persons

would be well informed about the project, they were brought together in one of four centres eleven days before the date chosen for the administration of the Student Questionnaire and the tests. At each centre the Chief Proctors met with a member of the project staff who described the questionnaire, tests, and administrative plan. Questions from Chief Proctors about the plan and its implementation were dealt with during the meeting.

By the day of the meeting with Chief Proctors, the assignment of students to sessions had been made for all but three of the participating schools. During the meeting computer generated lists of the names of the students assigned to each session were distributed for posting in the schools. Thus students were to be told in advance which sessions they would attend so that they could inform themselves about the nature of the tests they would write. This information was provided in a Student Handbook, sufficient copies of which were sent to the schools so that each student could be given his own copy. The handbook described the purpose of the Interface Project and the nature of each test. Sample questions provided opportunities for practice.

## 3.3 Distribution of Materials

The materials needed on the day the Student Questionnaire and the various tests were to be administered were sent to the Chief Proctor. An effort was made to place the materials in the school at least one full school day before the day they were to be used. The materials consisted of (i) instructions to the Proctors for each session, (ii) lists of the names of the students assigned to each session, (iii) sealed plastic envelopes containing the questionnaires and/or test books to be used by each student assigned to a session along with a label affixed to the envelope on which was printed the student's name, identifying number, and the titles of the books contained in the envelope, (iv) answer cards for distribution by Proctors as required, (v) the magnetic tapes required for administering the Tests of French as a Second

Language, and (vi) the materials required for packaging and returning the completed and unused materials to OISE.

### 3.4 Administrative Procedure

The general procedure for administering the instruments was for the students assigned to a session to assemble in the designated room, for the labelled envelopes of materials to be distributed to the designated students, and for the questionnaire and tests to be administered in a specified order (see Table 2) according to specified instructions. Proctors were to note absent students and to report all irregularities. A careful count of all materials was to be made both before and after test administration.

Chief Proctors were responsible for assembling all materials, both completed and unused from all sessions, packaging them and sending them back to OISE. There they were received and checked. The completed answer cards, essay books, Student Questionnaires, and test tapes were separated from the other materials and were processed as follows.

### 3.5 Answer Card Processing

An initial score was made by eye for incomplete coding of identification numbers and light responses. The cards were then read by optical scanner, and the information obtained was processed by computer. Checks were made by computer for incorrectly coded cards. A search was made by hand for these cards and where they could be found and where the required correction was obvious, the corrections were made. The types of errors corrected in this manner included incorrectly coded identification numbers, incorrectly coded test form numbers and incomplete erasures. The number of incorrect cards that either could not be located or could not be corrected when located because the corrections to be made were not obvious was less than one per cent of the total number of completed cards. Once

corrected, the cards were re-scanned and the final completed files of responses to the multiple-choice tests were prepared and scored.

## 3.6 Essay Processings

Considerable attention was given to the problem of possible inconsistencies in the standards applied by a variety of markers to essays written by SSHGD and SSGD students.

The English essays written by Anglophones and the French essays written by Francophones were sorted into piles by topic. Sets of 50 English and 50 French essays were chosen at random subject to the constraint that each set reflect the overall pattern of topic choice; for example, 10 of the selected essays dealt with the first topic and another ten dealt with the fourth, as these were the two topics most frequently chosen by the students. Five essays were selected from those written on each of the remaining topics. A further constraint was that each set of 50 essays was to be representative of the grade level and sex of the student authors. When the selection was complete, the sets of 50 English essays was reproduced 36 times and the set of 50 French essays was reproduced 9 times so that the 36 markers of English essays and the 9 markers of French essays would mark 50 essays in common.

The remaining English and French essays were reproduced in triplicate and sorted into one of either 36 stacks (English essays) or 9 stacks (French essays). The sorting was done subject to three constraints: that each stack would contain an equal number of essays, that each essay would appear in three different stacks and that each essay would occur in the top third of one stack, in the middle third of another stack, and in the bottom third of the remaining stack of essays. The sets of 50 essays were interleafed at random into the stacks, which were then sent to the markers. The allocation of stacks to markers was done in such a way that each essay, disregarding the 50 which were

marked by all markers, was graded by one postsecondary instructor and two secondary school teachers. For the English essays, a further constraint was that one of the two secondary school markers would have 10 or more years teaching experience and the other would have less.

Detailed instructions for scoring were prepared and included with the essays. In brief, these instructions asked markers to rate each essay for overall quality on a scale from 1 (low quality) to 10 (high quality). The meaning of this scale is the subject of further discussion in Appendix A1.

Two weeks after the essays had been rated and returned to OISE, the set of 50 essays (English or French) that had been only a part of all markers' assignments were returned to them for rescoring.

The English essays written by Francophone students as part of the <u>Test de connaissance de la langue (anglais)</u> were treated in much the same way as the English essays by Anglophones and the French essays by Francophones. Except for 20 essays chosen to be representative of the grade level and sex of student authors, the English essays by Francophones were each scored three times, once by a postsecondary instructor and twice by secondary school teachers. The set of 20 was scored by all six markers of the essays. The instructions to markers asked them to assign two scores to each paper. The first score was to reflect the adequacy of the summary that had been prepared. This score was to be assigned taking into account the number of relevant and irrelevant points made in the summary and the extent to which the summary exceeded 100 words. The second score was to be a global rating of the quality of the commentary written about the passage that had been summarized.

The French essays written by the Anglophones assigned to the <u>Writing Test</u> of the <u>Tests of French as a Second Language</u> were marked by two scorers. These individuals also marked the short answer section of the <u>Writing Test</u>. The essays were

assigned three scores--one was the total number of clauses in the essay, the second was the number of grammatically correct clauses in the essay and the third was the number of clauses in which there were no errors of spelling or vocabulary. These totals were then used to compute a total score on the writing exercise based on the quantity and the quality of the writing that a student did. The formula followed in computing this score is given in Appendix A3.

## 3.7 Processing Test Tapes

The administration of the Speaking Test of the Tests of French as a Second Language resulted in a number of tape-recorded responses. These were scored by one person who was familiar with the Speaking Test. Spoken responses to this test were scored for:

(a) the number of intelligible clauses;

(b) the number of different syntactical structures;

and--with regard to clauses only--the number correct in terms of

(c) syntactical structure,

(d) morphology,

(e) vocabulary and

(f) pronunciation.

From these counts, several different scores were computed (see Appendix A3); the only one that is included in this report is Total Fluency on the Speaking Test.

## 3.8 Processing the Student Questionnaires

The completed questionnaires contained a number of responses that required coding. These questions concerned the country of origin of the student and his parents, the languages spoken by the parents in the home and by the student in the community outside the home and school, the occupations of the parents, the educational plans of those students who said they were entering postsecondary institutions in the fall of 1976, the work plans of those students who said they were leaving school to take up employment, and long-term occupational goals of all students.

## 3.9 Test Appraisal Inventories

The secondary school versions of the Test Appraisal Inventories were sent to the schools along with the tests and questionnaires for students. The inventories were sent in the numbers that the Chief Proctors had indicated would be sufficient to provide one set of appraisal materials for teachers of SSGD level courses in the language of instruction of the school and in mathematics and for teachers of SSHGD level courses in the language of instruction of the school, calculus, functions and relations, physics and French for Anglophones or English (Anglais) for Francophones. (In Francophone schools, instructors of SSGD level English or Anglais courses were also asked to complete the questionnaire in the Test de connaissance de la langue (anglais).) Instructions were provided with the appraisal inventories so that they were "self-administering". The following constraints were to be imposed by the Chief Proctor: the inventories were to be completed sometime after the questionnaires for Interface Project III had been completed, and the conditions for completing the inventories were to be such that the security of the tests being appraised would not be compromised.

With the exception of a few inventories completed one or more days after the administration of the questionnaires and tests for students, the inventories were completed on the day

that the student instruments were administered. Most inventories were returned to OISE along with the student materials.

The postsecondary versions of the appraisal inventories were administered quite differently. Interface Project III personnel had compiled lists of instructors of first year English, French, and mathematics courses in 16 Colleges of Applied Arts and Technology, and lists of instructors of first year English, French, mathematics and physics courses in 11 universities. From these lists, the name of one instructor for each different course was selected. Where more than one instructor taught the same course, the choice was made at random subject to the constraint that no instructor who had been approached to complete questionnaires for Interface Projects I and III was chosen. Appraisal materials for the appropriate tests were mailed to each selected instructor who had been chosen, along with a letter requesting his/her cooperation in undertaking the appraisal. The letter stressed that whether or not the appraisal was made, the materials were to be returned to OISE.

All completed secondary and postsecondary appraisal inventories were coded with basic identifying information. At the same time, the qualitative, written responses of appraisers were recorded. The quantitative information in the appraisal forms was then entered into the computer files.

## 3.10 Course Records and Program Information

In order to obtain a more complete picture of the students' secondary school careers, it was necessary to obtain selected information about the courses they had taken and about the marks they had achieved in the SSGD or SSHGD level courses they had taken during the 1975-76 school year. Computer generated forms on which the required information could be written were sent to each school at the end of the 1975-76 school year.

On these forms were named the students about whom the information was required. The forms listed all the SSGD students who had been chosen to participate in the study. Except for schools with fewer than 50 SSHGD students who had participated in the study and fewer than 30 who had not participated, the forms listed a sample of the SSHGD students who had been expected to participate. The sample SSHGD included up to a maximum of 50 names of students who had written the tests as requested plus the names of up to 30 students who had failed to attend the test sessions as requested. The choice of the sample of attenders was made using score on the Test of Reading Comprehension and Language Achievement (English) or the Test de compréhension en lecture et de connaissance de la langue (français) as a stratifying variable. The choice of absentees was made at random from among those students who had failed to participate. The reason for requesting program and mark information on absentees, whether SSGD or SSHGD level students, was to ascertain whether they differed from attenders in the program of courses they had taken during secondary school and in the marks achieved in courses taken during 1975-76.

## 4. ADJUSTING THE DATA

Several procedures were implemented to make appropriate adjustments to the test data. The reasons why these procedures were required and a brief description of the procedures are given in the following paragraphs.

### 4.1 Equating

Two forms of each of the Test of Reading Comprehension and Language Achievement (English) and the Test de compréhension en lecture et de connaissance de la langue (français) were employed in the study. Among the Anglophone students, all of whom wrote the English test, there were some who wrote both forms, while

the rest wrote only one form. The Francophone students, all of whom wrote the français test, were also divided into a group writing only one form and a group writing both forms. Of the students who wrote both forms of a test, approximately one-half wrote them in the order Form 1-Form 2, while the other half wrote them in the reverse order. Of the students who wrote only one test, approximately one-half wrote one form while the other half wrote the other form. The forms of each test differed somewhat in degree of difficulty. Consequently, the score achieved by a student who wrote only one form was determined to some extent by chance; if he were assigned to write the easier form, his score would tend to be higher than it would have been had he been assigned to write the more difficult form.

No need for equating would have arisen had the scores from each form been analyzed separately. But this procedure would not have eliminated the contaminating effect of practice. This effect was present in the scores that the students who wrote both forms achieved on the form they wrote second. Those students who wrote only one form had no chance to benefit from practice; hence the performance of these students could be fairly compared with the performance of students who wrote both forms only if the comparison involved scores that the students who wrote both forms had achieved on the form written first. To have followed this plan of action and also to have analyzed the scores from each form separately would have meant that the number of students who contributed data for the analysis of either form would have been only approximately one-half the total number of students. Some of the group comparisons would then have involved relatively small numbers of students and the statistical precision of the comparisons would have been unnecessarily low. Clearly, the road to maximum possible precision was via score equating.

The procedure that was used is described in detail in Appendix D1. What was involved was using information gained from the subgroups of students who took both forms of a test to establish an equating formula. (The reason why some students were asked to write both forms was that their scores on both forms

could then be used to derive an equating formula.) This formula made it possible to take the score a student achieved on one form of the test into the score-metric of the other form of the test. In the case of the English test, Form 1 was used to define the scale. Students who wrote only Form 1 and students who wrote both forms but wrote Form 1 first were assigned the scores they actually achieved on this form. (The Form 2 scores of the students who wrote both forms in the order Form 1-Form 2 were ignored.) The students who wrote only Form 2 and the students who wrote both forms, but wrote Form 2 first, were assigned equated scores. These consisted of the scores they had achieved on Form 2 after an adjustment had been made to take the scores into the scale of Form 1. (The Form 1 scores of the students who wrote both forms in the order Form 2-Form 1 were ignored because performance on this form was inflated by the effect of practice on Form 2.)

The same procedure was followed for the français test, except that in this case, Form 1 was equated to Form 2.

## 4.2 Essay Scoring

A well known fact about the enterprise of essay marking is that different markers assign scores in different ways. Some markers are "soft" and assign marks that are higher on the average than those assigned by "hard" markers. Some markers assign scores that are bunched together whereas other markers spread the scores that they assign over the full range of possible scores. Some markers assign marks more reliably (consistently) than other markers. (The fact of differences in consistency of marking can be established by having all markers score a common set of essays. Some markers will be found who assign scores that deviate in a consistent way from the averages of the scores assigned by all the markers, whereas other markers will be found who assign scores that deviate in an inconsistent way from the averages, sometimes being higher, sometimes lower, but never in a way that makes it possible to predict when a score will be higher and when it will

be lower.) Because most of the essays in this study were marked by only three different persons, the procedure of assigning the simple average of the three marks as the essay score seemed potentially unfair; if by chance a student's paper were scored by three "hard" markers, the student would appear to have done less well than would have been the case if his paper had been marked by three "soft" markers. Arguments of a like nature can be made about the equity of having a paper scored by three consistent markers as opposed to three inconsistent ones, or three markers who tend to bunch their scores as opposed to those who spread their scores over the scale.

A procedure was devised to make appropriate adjustments in essay scores for differences among the markers in the severity and variability and consistency of their marking. This procedure is described in Appendix D2. Also reported in this appendix are the data that were used in applying the scoring procedure to the Writing Test (English), Test de composition écrite (français), and the Aptitudes à l'expression écrite parts of the Test de connaissance de la langue (anglais): the score on the Summary and the score on the Commentary.

After the essays had been scored so as to adjust for differences among markers, a final adjustment was made to the distribution of scores to ensure that they ranged over precisely the same scale as the markers had been asked to use. In the cases of the Writing Test (English), the Test de composition écrite (français), and the Aptitudes à l'expression écrite (anglais)--score on the Commentary, the marking scale was 1 to 10. The scale for the score on the Summary was 0 to 10.

### 4.3 Adjusting for Absenteeism and the Effects of the Sampling Plan.

There were two potential sources of distortion in the test results. The one that will be described first was produced by the fact that approximately 35 per cent of the students who were to

be tested did not go to school the day the tests were administered. If the typical absentee were a less able student than his more conscientious classmate, the test scores that were collected would be higher, on average, than they would have been had all students been in attendance. On the other hand, if the typical absentee were a more able student than his conscientious classmate, the obtained test scores would be lower, on the average, than they should have been. Other, more exotic, distortions due to absenteeism can be imagined. Obviously, a need existed to study and make allowance in the test results for whatever differences in ability there were between the students who wrote the tests and those who did not.

The second potential source of distortion in the test results was produced by the characteristics of the sampling procedure used to assign students to tests. For example, because the Physics Achievement Test was administered at the same time as the Writing Test (English), not all SSHGD level physics students were available for assignment to the Writing Test. Thus, SSHGD physics students were under-represented in the assignment of students to the Writing Test. This was true for both Anglophone and Francophone schools. Similarly, the SSHGD level Anglophone students who were eligible to write both the Mathematics Achievement Test and the Tests of French as a Second Language could only be assigned to one or the other, not both. As a consequence, this group was under-represented in the total group of students writing either test. Obviously, there was also a need to study and make allowance in the test results for any distortions due to this source.

The first step in the procedure used to adjust test scores for these potential sources of distortion was to collect course marks and program data from the schools. This was done for all of the SSGD students who had been sampled from each school. But because every one of the SSHGD students in a school had been scheduled for testing, the number of these students was so large in some schools as to make it impossible, for practical reasons, to obtain program and mark information on all of them.

Consequently, it was decided to collect this information on at most 50 of the SSHGD students in a school who had participated in the testing and on at most 30 of those who had been absent. If more than 50 students wrote the tests or more than 30 were absent, a random selection was made. In cases where a random selection of tested students was required, the sample that was chosen was stratified using score on the Test of Reading Comprehension and Language Achievement (English) or the Test de compréhension en lecture et de connaissance de la langue (français) as the stratifying variable. The marks that were collected were those that the students had earned in courses taken during 1975-76. The program data that were obtained consisted of the following: the total number of credits a student had accumulated during his secondary school career, the number of credits accumulated in English (français) courses, the number accumulated in mathematics courses, and, for each of the traditional academic subjects--English (français), French (anglais), history, geography, mathematics and science--the number of credits obtained in each of the categories of general and advanced level courses.

The next step in the adjustment procedure was to chose a test and to identify the students within each school who had written it and for whom mark and program data had been collected. If the test was one that had been written by students at both the SSGD and the SSHGD levels, then the students at only one level were identified and the students at the other level were set aside for separate treatment. Next, the test scores attained by students within a given school were regressed on the school mark average--the average was used because it provides a convenient measure of academic ability, one that is usually found to correlate reasonably well with test scores. For SSGD students, a second predictor variable was derived from the program data and entered into the regression; it was the ratio of the number of advanced level courses in traditional academic subjects taken during a student's secondary school career to the number of advanced and general level courses taken. (For SSHGD students, a second predictor variable was tried--the proportion of mathematics

courses taken in Grade Thirteen. Unfortunately, this variable had very low correlations with the scores on all tests except the Mathematics Achievement Test. For this reason it was discarded, and only the school mark average was used for these students.) Once the within-school regressions for a test (in combination with a level of student) had been determined for all schools separately, they were pooled to form very stable estimates of the regression weights.

The next step in the procedure was to concentrate on the data for a particular school. The regression function containing the pooled estimates of the regression weights was used to estimate what the mean test score for the school would have been had the absentees been present and had all the students eligible to take the test written it. This was done by entering, separately, two sets of numbers in the regression equation, a set for students who took the tests and for whom course marks and program data had been collected, and a set for the combination of these students and the students who might have taken the tests but did not and for whom course marks and program data had been collected. The numbers in each set were the means for the two groups on the one (SSHGD) or two (SSGD) variables on which test scores had been regressed. For SSHGD students, this variable was the mean, computed over the students in the group under consideration, of school mark average; for SSGD students, these variables were the means, computed over the students in the group under consideration, of school mark average and of the percentage of advanced level courses taken during the student's secondary school career. The determination of these means was not a simple matter because the complex nature of the sampling plans used to assign students to tests and to identify students for whom mark and program data would be collected had to be taken into account, using appropriately chosen weights.

The final outcome was two estimated test score means for a school, one based on students who did take the test, the other based on a combination of students who did take the test and students who did not, but might have. For each school, the

difference between these two test means was computed--a positive number indicated that the students who might have taken the test, but did not, had more ability on the average than the student who took it, while a negative number indicated that the students who might have taken the test, but did not, had less ability on the average than the students who took it. Whichever difference arose, it was added to the scores of all the students in the school who had taken the test. This addition was the adjustment that was made for absenteeism and for the distorting effects of the sampling plan.

Once the adjustment described in the preceding paragraph had been made for the combination of all schools and tests, the analysis of the data proceeded as though the problems caused by absentees and the sampling plan had never arisen. Because of the adjustment that was made in the test scores, the statistics reported in the section on diversity of test performance are as close to "correct" in terms of what they would have been had all the students eligible to take a test in fact taken it as the adjustment procedure could make them. But because the adjustment consisted simply of adding a constant to every test score within a school, it had no effect on the regression analyses that were conducted using the test data.

It should be noted that this adjustment procedure made use of linear regression. Non-linear regression might have been employed, but experience with the regression of test scores on marks suggests that linear regressions are usually satisfactory.

It should also be noted that the adjustment procedure that was used will not eliminate effects due to absenteeism if the absenteeism were caused by factors that are unrelated to scholastic ability but correlated with the residual term in the regression of test scores on school mark average and, in the case of SSGD students, the program variable. An example, not beyond the realm of possibility, is as follows: Had all students come to write the tests, suppose the teachers' "pets" had scored less well on a test than would have been predicted from their school

marks and program data whereas the other students had scored better than would have been predicted. Now suppose that only the teachers' pets came to write the tests. Obviously the adjustment procedure that was employed could not counteract such a happenstance as this.

Statistics that provide information about the effect of the score adjustment procedure are reported in Table 2.9. It can be seen that, on the average over all schools, the effect of the adjustment procedure was to lower scores on all but four tests; the four exceptions were the Test de composition écrite and the three different scores on the Test de connaissance de la langue (anglais) for SSHGD-level, Francophone students. It seems that the students who were eligible to take a test but who did not do so, either because they were truant or because they were assigned to take a different test, were, in general, somewhat less able academically than the students who did write the test. It is clear, however, from the fact that the adjustments in some schools were positive for each combination of test and student group, that the relative abilities of the students who did and who did not take the test varied considerably from school to school.

## PART B: UNIVERSITY RECORDS SURVEY

### 5. SAMPLING DESIGN

Part of the purpose of the study was to go beyond an examination of students' high school programs and marks-- to look as well at marks and programs of students completing their first year at university, and then to attempt to discover what relationships--if any--existed between students' high school histories and their performances in their first year at university.

The starting point for selecting a relevant sample of students was the Ontario Universities Application Center. OUAC provided a tape file with records on 27,008 students who had attended Grade Thirteen in 1974/75 and were thought to have enrolled at one of Ontario universities for 1975/76. From this file a sample of students was selected for whom university records were to be obtained at the close of the school year 1975/76. The selection was shaped by three major constraints:

(1) only the 11 universities being investigated by Project III should be represented;

(2) each of a set of high schools should be represented by a number of students sufficient to allow stable estimates of the regressions of university marks on high school marks;

(3) the universities should be represented by numbers of students sufficient to provide statistically meaningful information on each of the 11 institutions.

These constraints implied stratification. The total sample size was set at about 1,500.

Like the sampling for the SSGD/SSHGD Surveys, the University Records Survey sampling was done in two stages: primary sampling units were schools; secondary sampling units were students within schools.

## 5.1 Primary Sampling

As a preliminary step towards drawing the primary sample, a cross-tabulation was made of the number of students from each Ontario high school who were registered at each of the 11 universities included in the Project III sample of universities. This effectively eliminated 7 high schools, since all of their students went to unselected universities. The remaining high schools had at least one student going to one of the 11 selected universities.

The cross-tabulation of high schools by universities was then arranged so that those schools which sent their students predominantly to a given university appeared together in a single block. High schools sending equal numbers of students to two or more universities were arbitrarily assigned to the university appearing first in alphabetical order. Schools sending fewer than 10 students to the selected universities were printed in a separate block. The resulting 12 blocks (11 for the selected universities, 1 for the schools with few selectable students) defined the major stratification of the sample (see Table 2.10).

Within each of the 11 major strata for universities, schools were ordered according to the number of students sent to the university, and on that basis, some of the larger of the 11 strata were divided into substrata. As Table 2.11 shows, for instance, three large schools were placed in their own substrata.

The number of students to be drawn from each of the 11 major strata for universities (a proportion of the total sample of 1500) was determined by the proportion that the stratum represented of the total number of students going to the selected universities. The number of schools from which these students were to be drawn within each stratum was determined by the sizes of the schools in the stratum. (A decision had been made to draw 10, 15, 20, or 30 students from each chosen school, depending upon the size of the school--see Table 2.12). Where substrata had been defined, stratum quotas were divided among the substrata in proportion to the number of selectable students contained within the substrata (see Table 2.11). Finally, schools were drawn with probabilities proportional to the total number of students they sent to the selected universities.

For major stratum 12, containing schools with fewer than 10 selectable students, a different strategy was used. Subject to the single constraint that the number of students drawn from stratum 12 reflect the proportion that stratum contained of the total number of selectable students, schools were selected with equal probability, and all selectable students within chosen schools were drawn for sampling.

## 5.2 Secondary Sampling

From each school chosen from the 11 major strata for universities, a random sample of students was drawn. This sampling was done paying attention to whether or not the student was enrolled at the dominant university attended by graduates of his/her high school. As previously indicated, in schools selected from major stratum 12, no sampling of students was done. All students from chosen schools were included in the sample.

## 6. OUAC FILE

The students included in this survey had completed their work for the SSHGD in 1974/75 and had made application to attend a university in Ontario starting in September 1975. In completing the application form, a student provided the following information: country of birth, sex, age, and mother tongue. Each student's secondary school reported his/her course marks. Finally the OUAC itself recorded in each student's file the name of the university in which he/she registered in September 1975. Two pieces of information on the OUAC--the name of the school each student attended at the time of graduation from secondary school and the university in which he/she subsequently enrolled for study--were used in drawing the sample of students for study (see the previous section of this report). The other pieces of information drawn from the OUAC file were used as descriptors of the sample.

## 7. UNIVERSITY MARKS

Once the sample of students had been drawn, an alphabetical list of names was prepared for each of the 11 universities involved in the study. These lists were sent to the university registrars with a request for the following: the marks achieved by each student in his/her first year courses; the name of the program in which the student had been enrolled in his/her first year; information as to whether or not the student had received advanced credit for work he/she had done in secondary school; and information regarding any remedial instruction the student had been required to take in either language (English/French) or mathematics. (Information about advanced credit and remedial instruction was supplied on just a handful of students; hence this information was discarded and is not discussed further in this report.)

## 8. CLASSIFYING COURSES AND STUDENTS

Courses and students were classified as belonging to one of four program areas: Humanities/Arts, Social Sciences, Sciences, and Professions. There are several reasons why these four, and only these four categories were chosen for course and student classification. (i) These categories coincide with the divisions that university educators frequently impose on the various areas of study. (ii) The size of the sample that was studied was too small to permit a more finely grained analysis than this. Even with only four broad categories, it sometimes happened that the numbers of students in particular categories at particular universities were very small. (iii) On the other hand, classification of courses and students into fewer categories than four would have made even fuzzier the differences that exist among university departments and courses in the kinds of students they attract and in the standards of marking they impose. This is not to imply that all the courses within a category attract similar students and that similar marking standards are imposed by the instructors of all the courses within a category. The hope, however, is that the variation in students attracted to courses within each category, and the variation in marking standards across the courses within a category is smaller than the variation that exists in students and standards over the complete offering of courses in a university.

The application of the category system to university courses is reported in Appendix C. Each course taken by a student in the sample was uniquely assigned to one of the categories. Following the assignment of courses, a count was made for each student of the number of courses taken in each category. On the basis of this count, the student was also assigned to a category. The rules for making this assignment were as follows: (i) If a student had taken more courses in one category than in any other, he was assigned to that category. Note that it was not necessary for the student to have taken an absolute majority of courses in a category, but only a preponderance of courses relative to all other categories. (ii) If two or more categories were tied for

highest number of courses in a student's program, then the student was assigned to "Professions" if that category was among the set of tied categories. Otherwise, the student was assigned at random to one of the tied categories. The argument for this random assignment was that if a student took a relatively large number of professional courses in his first year of university, he was probably training for a profession, even though he also happened to take an equal number of courses in another area. On the other hand, if a student took equal numbers of science and social science courses in his first year, it seemed likely that he was searching for a major area but had not yet fixed on one. In such a case as this, random assignment of the student to one of the two categories seemed as fair a way as any other to classify him.

TABLE 2.1

The Number of Anglophone Schools Chosen from Each Regional Stratum and the Number of Refusals and Successful Replacement Attempts for Both Anglophone and Francophone Schools

| | No. of Schools Originally Chosen | No. of Original Schools Declining to Participate | No. of Replacement Attempts | No. of Successful Replacement Attempts | No. of Schools Finally in Sample |
|---|---|---|---|---|---|
| Anglophone Schools: Regional Strata | | | | | |
| Metropolitan Toronto | 15 | 11 | 8 | 5 | 9 |
| Hamilton | 2 | 0 | 0 | 0 | 2 |
| Northern Ontario | 5 | 3 | 5 | 3 | 5 |
| Urban Western Ontario | 6 | 2 | 3 | 1 | 5 |
| Urban Eastern Ontario | 10 | 3 | 3 | 3 | 10 |
| Rural Western Ontario | 11 | 0 | 0 | 0 | 11 |
| Rural Eastern Ontario | 11 | 1 | 3 | 1 | 11 |
| Total | 60 | 20 | 22 | 13 | 53 |
| Francophone Schools: | 15 | 1 | 0 | 0 | 14 |

TABLE 2.2

English Tests

| Part | Source | No. of Items | Description of Items | Time Allowed |
| --- | --- | --- | --- | --- |
| A | CSAT 1973, Section 3 | 10 | 2 reading comprehension passages with related questions | 15 minutes |
| B | CTEL, Section 1, operational items | 11 | Student is to reorder a grammatically correct sentence under specified constraints to make it more effective. | 10 minutes |
| C | CELAT 1970, Section 3, operational items[a] | 15 | Student is to judge whether the underlined portion of a given sentence is defective, and if so to choose a suitable replacement. | 15 minutes |

[a] Two operational items judged unsuitable were replaced by similar items used experimentally in the same section.

TABLE 2.3

Tests of French as a Second Language

| Test | Part | No. of Items | Description of Items | Time Allowed |
|---|---|---|---|---|
| Reading | | | | 30 minutes |
| | A | 17 | Students choose the best completion for a given incomplete sentence. | |
| | B | 22 | Six short reading comprehension passages, each followed by related questions. | |
| Listening | | | | 25 minutes |
| | A | 7 | Students choose the picture corresponding to a taped sentence. | |
| | B | 9 | Students choose the written response appropriate to a taped question. | |
| | C | 8 | Students select the written statement correct according to a short taped conversation. | |

TABLE 2.3 (continued)

| Test | Part | No. of Items | Description of Items | Time Allowed |
|---|---|---|---|---|
| | D | 5 | Students hear a short taped broadcast or announcement followed by a question and select the correct written response. | |
| | E | 5 | Students hear a long taped conversation or dramatic scene, followed by two or three questions; they select the correct written response to each question. | |
| Writing | | | | 25 minutes |
| | A | 26 | Students supply the correct French word to fill the blank in a given sentence. | |
| | | 6 | Students change a given French sentence to accommodate changes in number, person, gender, etc. | |
| | B | -- | Students write a short composition on a given topic, using themes supplied to them. | |

TABLE 2.3 (continued)

| Test | Part | No. of Items | Description of Items | Time Allowed |
|---|---|---|---|---|
| Speaking | | | | 20 minutes |
| | A | 16 | The student hears a short sentence repeated twice on the tape, then repeats it. | |
| | B | 10 | The student is asked a taped question about a picture and gives a brief response. | |
| | C | -- | The student reads aloud a passage in French after a 3-minute preparation period. | |
| | D | -- | The student chooses one of three series of pictures, and after a 1-minute preparation period describes what is happening in the pictures. | |
| | E | -- | The student chooses one of three pictures, and after a 1-minute preparation period describes the probable events before, during and after the time depicted, as well as the events depicted. | |

TABLE 2.4

Français Tests

| Part & Section | Source | No. of Items Formule 1 | No. of Items Formule 2 | Description of Items |
|---|---|---|---|---|
| A | TFLE, 1ère partie | 11 | 14 | Students are given reading comprehension passages and related questions. |
| B/1 | TFLE, 4ème partie, Section 1 | 8 | 7 | Students read four sentences and select the one, if any, containing an error in grammar or punctuation. |
| | | 5 | 5 | Students read a sentence, decide whether it contains an error, and classify the error, if any, under one of four headings. |
| B/2 | TFLE, 4ème partie, Section 2 | 11 | 9 | Students are given an incomplete sentence and asked to choose the word(s) or phrase(s) which best complete the sentence. |

TABLE 2.5

Test Appraisal Classifications
Secondary School Teachers

A. Old knowledge that students should have on entry to the course.
A1: This knowledge is not reviewed in the course.
A2: This knowledge is reviewed in the course

B. New knowledge that all students are expected to learn in the course.

C. New knowledge that some students are expected to learn in the course.
C1: Only 1% to 25% of students should learn this.
C2: Only 26% to 50% of students should learn this.
C3: Only 51% to 75% of students should learn this.
C4: More than 75% but not all students should learn this.

D. New knowledge that no student is expected to learn.

TABLE 2.6

Test Appraisal Classifications
Postsecondary Teachers

A. Old knowledge that students should have on entry to the course.
A1: This knowledge is <u>not</u> reviewed in the course.
A2: This knowledge is reviewed in the course.

B. New knowledge that <u>all</u> students are expected to learn in the course.

C. Other.

TABLE 2.7

A Listing of the Instruments Administered in Each Session in Anglophone Schools

| Part of Day | Session | | | |
|---|---|---|---|---|
| Morning | A1 | A2 | B | C |
| | Student Questionnaire | Student Questionnaire | Student Questionnaire | Student Questionnaire |
| | Test of Reading Comprehension and Language Achievement (Form 1) | Test of Reading Comprehension and Language Achievement (Form 2) | Test of Reading Comprehension and Language Achievement (Form 1 or 2) | Test of Reading Comprehension and Language Achievement (Form 1 or 2) |
| | Test of Reading Comprehension and Language Achievement (Form 2) | Test of Reading Comprehension and Language Achievement (Form 1) | Writing Test | Physics Achievement Test |

| Part of Day | Session | | | | |
|---|---|---|---|---|---|
| Afternoon | D | E | F1 | F2 | F3 |
| | Mathematics Achievement Test | Test of Arithmetic and Basic Algebra | Tests of French as a Second Language: | | |
| | | | Reading Test | Reading Test | Reading Test |
| | | | Listening Test | Writing Test | Speaking Test |

TABLE 2.8

A Listing of the Instruments Administered in Each Session in Francophone Schools

| Part of Day | Session | | | |
|---|---|---|---|---|
| Morning | A1 | A2 | B | C |
| | Questionnaire de l'étudiant | Questionnaire de l'étudiant | Questionnaire de l'étudiant | Questionnaire de l'étudiant |
| | Test de compréhension en lecture et de connaissance de la langue (français) (Formule 1) | Test de compréhension en lecture et de connaissance de la langue (français) (Formule 2) | Test de compréhension en lecture et de connaissance de la langue (français) (Formule 1 ou 2) | Test de compréhension en lecture et de connaissance de la langue (français) (Formule 1 ou 2) |
| | Test de compréhension en lecture et de connaissance de la langue (français) (Formule 2) | Test de compréhension en lecture et de connaissance de la langue (français) (Formule 1) | Test de composition écrite | Test de rendement en physique |

| Part of Day | D | E | F |
|---|---|---|---|
| Afternoon | Test de rendement en mathématiques (13ème année) | Test d'arithmétique et d'algèbre de base (12ème année) | Test de connaissance de la langue (anglais) |

TABLE 2.9

Summary Statistics on the Adjustments for
Absenteeism and the Effect of the Sampling Plan

Anglophone Schools (n=52)*

| | Mean Adjustment | S.D. | Largest Positive Adjustment | Largest Negative Adjustment |
|---|---|---|---|---|
| SSGD Tests | | | | |
| Test of Reading Comprehension and Language Achievement (English) | | | | |
| 1. Reading Comprehension Part | -0.10 | 0.17 | 0.24 | -0.51 |
| 2. First Language Achievement Part | -0.10 | 0.16 | 0.22 | -0.49 |
| 3. Second Language Achievement Part | -0.11 | 0.18 | 0.25 | -0.56 |
| 4. Total Test | -0.31 | 0.51 | 0.70 | -1.54 |
| Writing Test | -0.06 | 0.14 | 0.26 | -0.45 |
| Test of Arithmetic and Basic Algebra | -0.75 | 1.02 | 1.73 | -3.39 |

TABLE 2.9 (continued)

| | Mean Adjustment | S.D. | Largest Positive Adjustment | Largest Negative Adjustment |
|---|---|---|---|---|
| SSHGD Tests | | | | |
| Tests of Reading Comprehension and Language Achievement (English) | | | | |
| 1. Reading Comprehension Part | -0.12 | 0.15 | 0.24 | -0.51 |
| 2. First Language Achievement Part | -0.13 | 0.16 | 0.16 | -0.56 |
| 3. Second Language Achievement Part | -0.14 | 0.17 | 0.28 | -0.61 |
| 4. Total Test | -0.38 | 0.48 | 0.77 | -1.66 |
| Writing Test | -0.03 | 0.18 | 0.93 | -0.44 |
| Tests of French as a Second Language | | | | |
| 1. Reading Test | -0.45 | 1.52 | 3.83 | -7.26 |
| 2. Listening Test | -0.48 | 1.50 | 3.40 | -6.97 |
| Mathematics Achievement Test | -0.35 | 0.72 | 1.77 | -2.48 |
| Physics Achievement Test | -0.83 | 1.75 | 5.05 | -5.40 |

TABLE 2.9 (continued)

| | Mean Adjustment | S.D. | Largest Positive Adjustment | Largest Negative Adjustment |
|---|---|---|---|---|
| Francophone Schools (n=14) | | | | |
| SSGD Tests | | | | |
| Test de compréhension en lecture et de connaissance de la langue (français) | | | | |
| 1. Reading Comprehension Part | -0.15 | 0.17 | 0.15 | -0.35 |
| 2. First Language Achievement Part | -0.11 | 0.13 | 0.11 | -0.28 |
| 3. Second Language Achievement Part | -0.10 | 0.12 | 0.10 | -0.24 |
| 4. Total Test | -0.36 | 0.42 | 0.37 | -0.86 |
| Test de composition écrite | -0.11 | 0.17 | 0.19 | -0.39 |
| Test de connaissance de la langue (anglais) | | | | |
| 1. Reading Comprehension Part | -0.39 | 0.52 | 0.36 | -1.42 |
| 2. Writing Exercise - Summary | -0.16 | 0.19 | 0.16 | -0.47 |
| 3. Writing Exercise - Commentary | -0.17 | 0.18 | 0.77 | -0.59 |
| Test d'arithmétique et d'algèbre de base | -0.71 | 1.09 | 0.59 | -3.14 |

TABLE 2.9 (continued)

| | Mean Adjustment | S.D. | Largest Positive Adjustment | Largest Negative Adjustment |
|---|---|---|---|---|
| SSHGD Tests | | | | |
| Test de compréhension en lecture et de connaissance de la langue (français) | | | | |
| 1. Reading Comprehension part | -0.04 | 0.21 | 0.17 | -0.49 |
| 2. First Language Achievement Part | -0.03 | 0.14 | 0.11 | -0.32 |
| 3. Second Language Achievement Part | -0.04 | 0.18 | 0.15 | -0.43 |
| 4. Total Test | -0.11 | 0.53 | 0.42 | -1.25 |
| Test de composition écrite | 0.02 | 0.17 | 0.31 | -0.29 |
| Test de connaissance de la langue (anglais) | | | | |
| 1. Reading Comprehension Part | 0.08 | 0.23 | 0.66 | -0.25 |
| 2. Writing Exercise - Summary | 0.02 | 0.05 | 0.16 | -0.06 |
| 3. Writing Exercise - Commentary | 0.04 | 0.11 | 0.32 | -0.12 |

TABLE 2.9 (continued)

| | Mean Adjustment | S.D. | Largest Positive Adjustment | Largest Negative Adjustment |
|---|---|---|---|---|
| Test de rendement en mathématiques | -0.20 | 0.92 | 0.93 | -2.16 |
| Test de rendement en physique | -0.48 | 1.55 | 1.20 | -5.01 |

*The number of Anglophone schools in the sample was 53. But one of the schools only provided SSHGD students and the other only provided SSGD students; hence the sample of Anglophone schools for each level of student was 52.

TABLE 2.10

Major Stratification

| Stratum | Number of Selectable Students | Number to Sample |
|---|---|---|
| 1. Brock dominant | 504 | 40 |
| 2. Carleton dominant | 1828 | 140 |
| 3. Guelph dominant | 629 | 50 |
| 4. Lakehead dominant | 210 | 20 |
| 5. Laurentian dominant | 529 | 40 |
| 6. McMaster dominant | 2300 | 180 |
| 7. Ottawa dominant | 806 | 70 |
| 8. Toronto dominant | 7662 | 630 |
| 9. Trent dominant | 156 | 20 |
| 10. Waterloo dominant | 2109 | 170 |
| 11. Windsor dominant | 1006 | 80 |
| 12. Schools with fewer than 10 selectable students | 616 | 50 |
| | 18355 | 1490 |

TABLE 2.11

Substratification

| Stratum and Substratum | Substratification[a] | Number of Selectable Students | Number to Sample |
|---|---|---|---|
| 1 | | 504 | 40 |
| 2.1 | 2-14 | 523 | 40 |
| 2.2 | 15-56 | 1305 | 100 |
| 3 | | 629 | 50 |
| 4 | | 210 | 20 |
| 5 | | 529 | 40 |
| 6.1 | 4-19 | 747 | 60 |
| 6.2 | 20-123 | 871 | 80 |
| 6.3 | 124 (1 school) | 151 | 10 |
| 6.4 | 195 (1 school) | 260 | 15 |
| 6.5 | 204 (1 school) | 271 | 15 |
| 7 | | 806 | 70 |
| 8.1 | 3-19 | 1834 | 150 |
| 8.2 | 20-49 | 2965 | 240 |
| 8.3 | 50-96 | 2863 | 240 |
| 9 | | 156 | 20 |
| 10 | | 2109 | 170 |
| 11.1 | 6-52 | 481 | 40 |
| 11.2 | 53-125 | 525 | 40 |
| 12 | | 616 | 50 |

[a]For strata 2,6,8 and 11, there was substratification according to the number of selectable students per school. The range is indicated here. Note that substrata 6.3, 6.4, and 6.5 consisted of exactly one school each.

TABLE 2.12

Numbers of Schools and Students to be Drawn

| Stratum and Substratum | Number of Schools to Draw | Students per School |
|---|---|---|
| 1 | 4 | 10 |
| 2.1 | 4 | 10 |
| 2.2 | 5 | 20 |
| 3 | 5 | 10 |
| 4 | 2 | 10 |
| 5 | 4 | 10 |
| 6.1 | 6 | 10 |
| 6.2 | 4 | 20 |
| 6.3 | 1 (single school) | 10 |
| 6.4 | 1 (single school) | 15 |
| 6.5 | 1 (single school) | 15 |
| 7 | 7 | 10 |
| 8.1 | 15 | 10 |
| 8.2 | 12 | 20 |
| 8.3 | 8 | 30 |
| 9 | 2 | 10 |
| 10 | 17 | 10 |
| 11.1 | 4 | 10 |
| 11.2 | 2 | 20 |
| 12 | as needed to get 50 students | all |

# CHAPTER THREE

# RESULTS

The structure of this chapter has been defined by the structure of the project itself. Project II was mounted to conduct two surveys--the SSGD/SSHGD Survey and the University Records Survey. Correspondingly, this chapter is divided into two major sections, one for each survey, with the results of the SSGD/SSHGD Survey appearing first in Part A. Another important division in the chapter was made because the survey of SSGD/SSHGD students was focussed on two distinct populations. Consequently, Part A deals firstly with the results of the SSGD/SSHGD survey for Anglophone students, and secondly with the results for Francophone students.

## PART A

## THE SSGD/SSHGD SURVEY

In the SSGD/SSHGD survey, attention was focussed on three main issues: (i) the extent of diversity among students, particularly with respect to tested achievement, (ii) the extent of variability in marking standards across secondary schools, and (iii) the degree to which academic achievement, as it is reflected in test scores, can be predicted from characteristics associated with the students and characteristics associated with the secondary school the student attends. These issues are dealt with in turn for the survey of Anglophone students, and then for the survey of Francophone students.

## 1. ANGLOPHONE STUDENTS

Before the results on Anglophone students are presented, it is necessary to deal with some technical matters.

### 1.1 Technical Matters

A. Test Validity

It was important to establish the content validity of the tests used in Project II. The term "content validity" refers here to the importance to educators at the Interface of the knowledge--facts, concepts, understandings, skills--required to answer the questions or perform the exercises contained in a test. Obviously, the significance of the results obtained in this study rides on the content validity of the tests. The study could have been well executed in all other respects, but if unacceptable tests were used, the good execution would have been for nought.

Two steps were taken to establish test validity: one before the administration of the tests, the other after. The first step was to have the tests selected or constructed, whichever, by special committees. Committee members were chosen for their expertise in the subject-matter areas being tested and for their familiarity with both the courses that are offered at the Interface and the students who take these courses. All committees operated under extreme pressure of time in view of the deadlines that had to be met in the study. This pressure left the committees feeling less satisfied about their recommendations than they might have felt had more time been available to explore alternatives and engage in test development. The instruments that the committees recommended have been described in the preceding chapter.

The validation step that occurred after the administration of the tests was to submit them for appraisal to secondary school teachers and postsecondary instructors. The secondary school teachers who were contacted for this purpose were employed in the schools that participated in the project; the postsecondary instructors who appraised the tests were employed by one of the 11 universities and the 16 Colleges of Applied Arts and Technology that had been selected for study by the staff of Project III.

Tests were appraised in somewhat different ways, depending on the nature of the test and the subject matter area to which it related. In judging the tests of mathematics and physics, for example, appraisers were asked to consider every single test question in relation to the content of courses at the Interface; to judge whether or not students at the Interface could reasonably be expected to have the knowledge needed to answer each question; and if so, to decide whether that knowledge probably would be in their possession because it had been learned prior to their entering a course at the Interface or because it had been learned as part of a course at the Interface. On the other hand, appraisers of the language tests for Francophone students and the tests of English for Anglophone students were asked to make judgements of a more general nature, such as whether or not each different type of question assessed an important aspect of language competence; whether or not the difficulty of the questions was suitable; whether or not the format of the test was appropriate; and, in the case of essay questions, whether or not each of several criteria for scoring should be given equal weight. Appraisers of the Tests of French as a Second Language were asked to make both kinds of judgements--those about individual items and those about the general nature of the test.

The judgements offered by the appraisers of the different tests have been tabulated and the results are reported in detail in Appendices A1 through A9. Readers interested in the appraisal of a particular test are referred to the appendix for that test.

The following general conclusions follow from the effort expended in test validation:

(a) It was the opinion of the test selection committees, and this opinion was corroborated by the appraisers, that each of the tests used in the study assessed important aspects of the knowledge that students at the Interface should have and, moreover, that the test did so with questions presented in an acceptable format and pitched at a suitable level of difficulty.

(b) It was acknowledged by the test selection committees, and the point was forcefully made by the appraisers, that the tests were not perfect; they provided only limited coverage of the knowledge students should have, and they contained some questions that were unsuitable, either because they were too difficult, or because they were not difficult enough, or because they were focussed on irrelevant knowledge.

In summary, the results of the test validation exercise indicate that the performance of students on the tests used in this study should convey an important message about student achievement at the Interface; but they indicate too, that this test performance certainly will not tell the whole story.

## B. Interpreting Test Scores

The interpretation of a score on a test is dependent first and foremost on the content of the test. (Hence our concern for validity, treated in the previous section.) In addition, score interpretation depends on the purpose for which a test was built. Two broad classes of educational tests can be distinguished in terms of purpose. One class contains instruments designed to differentiate students, that is, spread them over the range of possible scores. The other class contains tests designed to assess the degree to which students have mastered some well-defined body

of knowledge. An ideal test of the first kind would be recognized by the fact that students who wrote it were indeed spread over the range of possible scores, with some standing at or near the bottom of the range and some standing at or near the top. In addition, the average of all students' scores would be somewhere near the middle of the range. An ideal test of the second kind would be recognizable from the questions it contained, but only an expert in the field of study that the test was designed to assess would be able to say that it did indeed assess the knowledge required for mastery of that field of study. There is no necessary expectation that this second kind of test will spread students over the range of possible scores. An entirely possible, and in some situations, a desired outcome, for such a test would be for all students to get the same, perfect score.

The distinction between a test designed to differentiate and one designed to assess mastery is somewhat arbitrary because the former necessarily contains questions about some body of content--there must always be concern about the content validity of a test, no matter what its purpose--and the latter may differentiate very well among the students in a certain group. Nevertheless, if one set out to construct a test that would spread students over the range of scores, the procedure used to select items for such a test would differ from the procedure that would be used if one wanted, instead, to construct a test of mastery. A test designed to differentiate students must contain items that have content validity and that, in addition, satisfy two statistical criteria. (i) Ideally, each item in such a test should be correctly answered by approximately one-half of the students. In multiple-choice tests, the ideal level of item difficulty is usually regarded to be near the mid-point between the percentage of correct answers reflecting chance performance on an item and 100 per cent correct answers. In practice, test constructors are usually satisfied if the percentage of students who answer an item correctly approaches neither 100 nor the percentage associated with chance and if, on the average over all the items in the test, the percentage of correct answers is either midway between 100 and the percentage associated with

chance, or slightly higher. (ii) The scores that students achieve on individual items of differentiating tests should correlate well with the scores they achieve on the test as a whole; that is, the items should have high indices of "discrimination". (The task of item selection is discussed in a number of sources; see, for example, Mehrens and Lehmann, 1973.)

Items for a test designed to assess the degree to which a body of knowledge has been mastered should be selected paying little or no heed whatever to item difficulty and discrimination. The main questions that should guide the selection of items for such a test include (i) whether or not each item is judged to tap an important aspect of knowledge, and (ii) whether or not the collected set of items is judged to cover the body of knowledge adequately (see, for example, Millman, 1974; Cronbach, 1971).

In the present study, we wanted objective tests and essay scoring procedures that would differentiate students and spread them over the range of scores. There are several reasons why this was the desired type of test and scoring procedure:

(a) A major purpose of the study was to assess the extent of differences among the students in different groups. This objective could be realized only if the assessment procedures used were sensitive to differences among students. Of course, not such a high level of individual discrimination was required in this survey of the achievement of groups of students as would be required in a testing program aimed at individual student assessment.

(b) Another major purpose of the study was to provide correlations between school marks and standardized achievement test scores. One of the necessary conditions for such correlations is variability of scores on the test.

(c) Even if tests of "mastery" had been desired, the time available for selecting or constructing tests for use in the study was extremely short. For the most part, we had no option but to resort to the use of existing tests, and these were instruments that had been designed to differentiate students.

Because use was made of tests and scoring procedures designed to spread students over the range of scores, the reader must realize that the test results reported here do not necessarily conform to expectations based on school experience. The results of classroom tests are often reported in percentage form. When this is the case, it is unusual for test scores to dip below 50 per cent; the effective range of such scores is from 50 to 100. To get only half the marks assigned on a classroom test and, consequently, to score only 50 per cent, is to do relatively badly.

The test results that we report are not percentages. For objective tests, we report scores on scales defined by the number of items in the test and the rule applied to correct for guessing. For essay tests, we report scores on the arbitrary scales that markers were told to apply. Given that the ideal "discriminating" test is one on which the mean or median score is near the mid-point of the score range, readers should not be surprised to find that this ideal is approached in many results. The reader's interest probably should not extend to a comparison between the score actually achieved on a test and the maximum attainable score on a test, for this comparison provides little, if any, directly interpretable information about the quality of the performance that produced the achieved score. The meaningful comparisons of score levels that can be made are those that involve different groups of students. These comparisons, along with the information that emerges from the regression (prediction) studies, constitute the results that this project was designed to produce.

## C. Statistical Procedures

Information was collected in this study on two different types of student variables. One type can be described as categorical, e.g. sex of student, language spoken by parents. The second type can be described as continuous, e.g. age, score on test. The results for a categorical variable consist of the percentage of students selecting each response category. These percentages were obtained by computing the percentage separately for each school in the study, and then taking the average (mean) of these percentages over schools. The standard error of this estimate was itself estimated as a function of the variability of the percentages over schools.

The results for continuous variables consist of selected percentiles of the distributions of observations on the variables. Five percentiles were selected for reporting purposes: the $10^{th}$, $25^{th}$, $50^{th}$, $75^{th}$ and $90^{th}$. (The $10^{th}$ percentile is the point on the scale of measurement for a variable such that 10 per cent of the observations in the distribution of observations on the variable fall below that point.) These percentiles were chosen because they indicate something of the variability of scores in a distribution, and in addition, provide a typical or "average" value for the distribution in the form of the median ($50^{th}$ percentile).

The procedure used to estimate percentiles and their corresponding standard errors is described in this paragraph. To start with, a set of fixed numbers from along the range of scores for a variable was selected. With distributions of essay marks, for example, the integers from 1 to 10 were used. For each fixed number, an estimate was obtained of the percentage of students who got a score equal to, or less than, the number. (Fixed numbers for which the corresponding percentage was less than three or more than 97 were deleted from the set.) Also, an estimate of the standard error of this percentage was obtained. The method used to compute these estimates is the same as that employed with the categorical variables; this method was

described earlier. To estimate the desired percentiles, the percentages corresponding to the set of fixed numbers was transformed using the inverse of the logistic transformation. Then the set of fixed numbers was regressed on the transformed percentages using a second-order polynomial function. The percentiles corresponding to the percentages 10, 25, 50, 75 and 90 were obtained by transforming these percentages, using the inverse logistic, and substituting each transformed percentage in the regression equation and computing the result. This procedure was judged a better method of estimation than the obvious graphical procedure that was tried and might have been used, because in fitting the regression line, some smoothing of irregularities in the "raw" results inevitably took place.

To estimate the standard errors of percentiles, it was necessary first to obtain estimates of the standard errors of their percentages. This was done by regressing the standard errors of the percentages corresponding to the set of fixed numbers on the percentages themselves, fitting a second order polynomial as the regression function. Then, by substituting the percentages 10, 25, 50, 75 and 90 into the regression function, estimates of the standard errors of these percentages were computed. Finally, the standard errors of the percentiles corresponding to the percentages 10, 25, 50, 75, and 90 were estimated. These are approximately equal to the standard errors of the percentages times the inverse densities of the score distribution at the percentile points. The required density was taken to be that of a normal distribution at the percentile of interest ($10^{th}$, $25^{th}$, etc.). The standard deviation of the normal distribution for which a density was required was estimated as follows: In the case of the median, the semi-interquartile range was computed, and in the case of any other percentile, the difference between the median and the percentile was computed. Each of these quantities was taken to be in the same ratio to the desired standard deviation as the corresponding quantity in the unit normal distribution would be to a standard deviation of unity.

## 1.2 Student Diversity

A. Definition of Groups

In this section of the report, results are presented on student test performance and also on selected background characteristics of students and on selected characteristics of the secondary school programs taken by students. This presentation is made for three different groups of SSGD students and two different groups of SSHGD students:

(a) Groups of SSGD Students

(i) Those planning to return to secondary school in 1976-77 (identified as SSGD-SEC; N = 960).

(ii) Those planning to enter a postsecondary institution in September 1976 (SSGD-POSTSEC; N = 302).

(iii) Those planning to enter the work force, get married, etc. (SSGD-OTHER; N = 532).

(b) Groups of SSHGD Students

(i) Those planning to enter a postsecondary institution in September 1976 (SSHGD-POSTSEC; N = 3060).

(ii) Those reporting other plans, e.g. work, marriage, return to secondary school, travel (SSHGD-OTHER; N = 696).

These groups were established on the basis of student responses to a question in the Student Questionnaire about plans for 1976-77. A follow-up question to those students planning to enter a postsecondary institution generated the statistics presented in Table 3.1. Because this is the first table of its kind to appear

in the report, a statement to guide the reader's interpretation of the numbers in the table is given here.

Table 3.1 illustrates the form of tabular presentation of results for a categorical variable. The statistic of primary importance in the table for a categorical variable is a percentage. In Table 3.1, each percentage is an estimate of the fraction of the population of Ontario students constituting the group named in a row of the table who have applied to an institution of the kind named in a column of the table. Three other important kinds of numbers are given in each table. These include the size of the sample of students in the Anglophone schools who contributed the responses on which each percentage was estimated, and the number of schools represented by these students. These two figures appear in each row label in the table. The third additional type of number is an estimate of the standard error of each percentage. This figure is needed to establish a confidence interval for the "true" percentage in the population and also to test for the statistical significance of differences among corresponding percentages in two different rows of the table. As a rough rule of thumb, the hypothesis that the "true" percentages being estimated by two percentages in the same column of a table are equal can be safely rejected if the difference between the two estimates is larger than twice the sum of their standard errors. (Note that no standard error is reported for the percentage of No Responses. This number was computed simply as the percentage of No Responses in the total number of students responding; hence it is not, strictly speaking, a population estimate in the same sense as the other percentages that are reported, and its standard error could not be estimated in the same way that the standard errors of the other percentages were determined.)

Returning to a discussion of the results contained in Table 3.1, it can be seen that the vast majority of students in the SSHGD-POSTSEC group had plans in May 1976 to enter university later that same year. A very much smaller, though nonetheless substantial, fraction of this group planned to enter a College of

Applied Arts and Technology. Of the students in group SSGD-POSTSEC, on the other hand, two-thirds said they were headed to a CAAT college and less than 10 per cent said they were university-bound. A surprisingly large number of the students in the SSGD-POSTSEC group gave no response when asked to name the institution to which they had applied for postsecondary work, indicating that these students had not yet applied for admittance to a tertiary institution, although their plans lay in that direction.

The destinations for 1976-77 of students in the groups labelled SSGD-OTHER and SSHGD-OTHER are reported in Table 3.2. It can be seen that a very substantial majority of the students in each group planned to enter the labor force. An attempt was made in the questionnaire to ascertain whether or not these individuals had jobs to go to, and if so, the nature of that work. Unfortunately, all but a handful of the students who said they were work-bound failed to answer these questions, so no further information on this point is available.

A substantial proportion (17 per cent) of the SSHGD-OTHER group said they were planning to return to secondary school in September 1976. It is not known whether these students had been wrongly identified as eligible for an SSHGD, or whether they recognized the fact that they were failing one or more credits and would have to return to make them up before obtaining the SSHGD, or whether they were planning to return for the purpose of broadening their education.

An indication of the future plans of that fraction of the SSHGD-OTHER group who said they were returning to secondary school and all of the SSGD-SEC group is given in Table 3.3. Students who said they planned to return to secondary school for 1976-77 were asked whether they had plans to embark on postsecondary education sometime before the end of 1979. As can be seen from the figures presented in Table 3.3, most of that fraction of the SSHGD-OTHER group who said they would be returning to secondary school in 1976-77 did have plans to enter

a postsecondary educational institution before 1979. The same is true for the vast majority of the SSGD-SEC group. Given this information on the SSGD-SEC group, it seems safe to presume that this group is composed of students who would be returning to school in 1976-77 to work for their Secondary School Honour Graduation Diploma. This presumption would also follow from the fact that these students were all identified by school principals as being eligible for a Secondary School Graduation Diploma in June 1976; hence, their planned return to school would be for the purpose of earning an SSHGD, unless, of course, they happened to fail courses being taken during the academic year 1975-76 which were needed for the SSGD or they had been incorrectly identified as SSGD students in the first place. No information was obtained concerning these possibilities.

The information obtained on these five groups is presented in the following three portions of this part of Chapter Three. B is on background characteristics of students; C on characteristics of students' programs; and D on achievement test results. Results are reported in tabular form and, in cases where it was deemed appropriate and additionally informative, in the form of graphs, with one table and, for the results that were graphed, one figure per characteristic (variable) that was studied. Each table or graph contains one line of results for each group for which information was available.

## B. Background Characteristics

The extent of diversity within and among the five student groups--SSHGD-POSTSEC, SSHGD-OTHER, SSGD-SEC, SSGD-POSTSEC, SSGD-OTHER--on a variety of background characteristics is described by the statistics reported in Tables 3.4 to 3.13. Because Table 3.5 is the first containing results on a continuous variable--age--it is important to pause here and discuss the interpretation of results for such variables.

The table of results for a continuous variable is a little more difficult to interpret than the table for a categorical variable, primarily because for continuous variables information is provided about the distribution of scores. Consider Table 3.5. Five percentile points are reported from the age distribution of each of the five student groups. The $50^{th}$ percentile point is the median of the distribution. Like the mean, the median is an average value. In an age distribution, the median is that age below which 50 per cent of the observations comprising the distribution fall. In other words, 50 per cent of a group of students are younger and 50 per cent are older than the median age for the group. In addition to the median, four other percentiles are reported for each continuously distributed variable. Every percentile has an interpretation that is analogous to the interpretation of the median. Thus, for example, the $25^{th}$ percentile of an age distribution is that age below which 25 per cent of the distribution falls and above which 75 per cent of the distribution falls. This is to say, 25 per cent of a group are younger than the $25^{th}$ percentile of the age distribution and 75 per cent are older.

Several well-chosen percentiles provide useful information for making comparisons both within a distribution, and between it and another distribution. By comparing within the same distribution the $10^{th}$ percentile and the $90^{th}$, or the $25^{th}$ percentile and the $75^{th}$, one gets an impression of the spread of the distribution. By comparing the $10^{th}$ and $90^{th}$ percentiles of a distribution with the median, one can tell whether or not the distribution is markedly skewed, either positively, in which case the difference between the $90^{th}$ percentile and the median is substantially <u>larger</u> than the difference between the $10^{th}$ percentile and the median, or negatively, in which case the difference between the $90^{th}$ percentile and the median is substantially <u>smaller</u> than the difference between the $10^{th}$ percentile and the median. In comparing two distributions, it is possible to see whether the difference between corresponding percentiles is constant across the range of scores on both distributions or whether, instead, the difference between

corresponding percentiles varies from one part of the distribution to another.

In addition to percentiles, the tables for a continuous variable contain two other kinds of information. One kind concerns sample size. Both the number of students on which the percentiles for a group are based (symbolized N) and the number of schools represented by these students (symbolized n) are reported. The other kind of information is the estimated standard error of each percentile. Computed using the procedure described earlier in this chapter, these standard errors provide the required information to form a confidence interval for a percentile and to test for the significance of the difference between percentiles (see the earlier discussion of these issues in connection with the tables of results for categorical variables).

With the foregoing discussion about the interpretation of tables for continuous variables and the earlier discussion about the interpretation of categorical variables, the reader is encouraged to study Tables 3.4 to 3.13. Attention is directed toward the following features of the results contained in these tables.

(a) There was a preponderance of males in the SSHGD-OTHER group and a slightly smaller preponderance of females in the SSGD-POSTSEC group (Table 3.4).

(b) As expected, the SSHGD groups were approximately one year older than group SSGD-SEC, but the age difference between the two SSHGD groups and the two SSGD groups who were leaving school was considerably less than a year on average (Table 3.5).

(c) All but from 3 to 5 per cent of students, regardless of group membership, spoke English outside the home and the school, whereas from 10 to 18 per cent heard a language different from English spoken by their parents/guardians; the group containing the largest

percentage of students who heard a language different from English spoken in their homes is the SSHGD group going on to postsecondary training (Table 3.6).

(d) A relatively large percentage of students in the SSGD-POSTSEC and SSGD-OTHER groups compared to the percentages of students in the other groups, had received their education in a language of instruction other than English for one or more years over the course of their school careers (Table 3.7).

(e) Somewhat more than 10 per cent of students in all SSHGD and SSGD groups combined were foreign-born (Table 3.8).

(f) The majority of foreign-born students had resided in Canada for five or more years (Table 3.9).

(g) Both the parents/guardians of one quarter of the students were born outside Canada, and one parent/guardian of a further 10 per cent of students was born outside Canada (Table 3.10).

(h) The educational and occupational levels attained by the parents/guardians of SSHGD-POSTSEC students are higher on average than the levels attained by the parents/guardians of SSHGD-OTHER students; similarly, the educational and occupational levels of the parents/guardians of SSGD students scale from high to low in the order SSGD-SEC, SSGD-POSTSEC, and SSGD-OTHER (Tables 3.11 and 3.12).

(i) From 4 to 12 per cent of students, depending on the group, claimed to be disadvantaged by the fact that the postsecondary programs they would have liked to study were not available in French (Table 3.13). Although this is not really background information, as such, it

provides additional evidence on the French language capabilities of the students in Anglophone schools.

The Student Questionnaire contained questions about plans for employment that were to be answered by students going on to full-time work and questions about career plans that all students were to answer. Too few of the students in any group responded to these questions to make the results interesting; hence they have been ignored in this report.

Inevitably there is interest in a comparison between the present and the past. Such a comparison can be made to a limited extent, using results obtained in the Atkinson Study of the Utilization of Student Resources. In February of 1956, virtually all Grade Thirteen students in Ontario were administered a questionnaire in which they indicated, among other things, their age and sex, and the educational levels attained by their parents, and the occupations of their parents. Subsequently, it was ascertained whether these students went from Grade Thirteen into university, some other form of postsecondary training, or the labour force. Comparisons between the Atkinson students and the students tested in Interface Project II would seem to have most validity if the Atkinson students who went to university or to some other postsecondary institution were combined to form a single group, one that could be called ATKINSON-POSTSEC and would be analogous to the SSHGD-POSTSEC group of the present study. The ATKINSON-WORK group is somewhat comparable to the SSHGD-OTHER group of the present study in that approximately two-thirds of this latter group said they were going to take up employment after leaving school. Despite this attempt to render the Atkinson data comparable to those of the present study, it must be remembered that the Atkinson groups were formed on the basis of what students actually did after leaving secondary school, not on what students said they would do, as in the present study.

The sex distribution and the median age of the two groups of Atkinson students are reported in Table 3.14. It can be seen from the distribution of the sexes in the Atkinson groups, as compared with the 1976 distributions reported in Table 3.4, that the percentage of females in the SSHGD group has increased during the 20 years between the time the Atkinson data were collected and the time that Project II data were collected. Comparing the median ages reported in Table 3.14 with the medians for the SSHGD groups reported in Table 3.5, it would appear that the Atkinson students were younger than Project II students. This difference is more apparent than real, because the Atkinson questionnaire was administered three months earlier in the school year than the Project II questionnaire. Also, the age distributions reported for the Atkinson students had very few categories, hence the estimates of the median ages for these groups of students are very crude.

A comparison of educational levels attained by the parents/guardians of both Atkinson and Project II students is possible from the figures in Table 3.15. The comparison is weakened by the fact that the Atkinson data on educational level consisted only of YES-NO responses to two questions for each parent: Did your father (mother) attend high school? Did your father (mother) attend university? To make a comparison at all, pairs of categories in Table 3.11 had to be combined--2 with 3, 4 with 5, and 6 with 7. Even then, for the comparison with Project II results on the category of "attended university" to be valid, it must be assumed that Atkinson students included all postsecondary institutions in the category of a university when they responded to this question. Otherwise, the percentages in this category for the Atkinson groups are spuriously low. As it is, the figures in Table 3.15 suggest that on the average the parents/guardians of 1976 SSHGD students obtained more formal education than the parents of 1956 SSHGD students.

Information on the occupation of guardians/parents was obtained in both the <u>Atkinson Study</u> and this one. Unfortunately, the results are not comparable. The Blishen scale was not

available to the Atkinson researchers; their classification of jobs into the categories of unskilled-manual, semi-skilled manual, and so forth does not translate directly into the scores from 2 to 7 on the Blishen scale.

## C. Program Characteristics

Information was obtained from each participating school on the programs of courses taken by all the SSGD students who were sampled (regardless of whether or not they participated in the testing); and on the programs of courses taken by at most 50 of the SSHGD students who were tested, and at most 30 of the SSHGD students who were expected to participate in the testing, but, in fact, did not. The tabulations that were made of this information are presented in Tables 3.16 to 3.19. The results in the first two of these tables concern SSHGD-level students and the results in the last two tables concern SSGD-level students. Notice that there is an extra group for each level of student. This group consists of students who had been assigned to take the tests but who stayed away from school on testing day. Inasmuch as these individuals did not complete the Student Questionnaire, the information about their future plans which was needed to assign them to one of the other groups was not available. For obvious reasons, the extra group at each of the SSGD and SSHGD levels has been labelled "ABSENTEES". Results on this group at each level are of interest because they provide some more information about the students who were expected to participate in the surveys, but did not. (Recall that the analyses to adjust test scores--see Chapter Two--revealed that these students were somewhat less able academically, on the average, than the students who took the tests.)

Because the information presented in Tables 3.16 to 3.19 is different from that which has been displayed in previous tables, a word is in order about the interpretation of results concerning program information. Consider Table 3.16, which presents information about the number and kind of credits

accumulated by SSHGD-level students. For each type of credit on which information is presented, what is reported is the percentage of students in each group who had accumulated a specified number of credits or more. Consider an example: From Table 3.16 we see that an estimated 85 per cent of the population of SSHGD-POSTSEC students had accumulated at least 33 credits, 78 per cent at least 34 credits, 68 per cent at least 35 credits, and so on. All percentages reported in Table 3.16 and the other three tables for this section of the report can be interpreted this way. The now familiar base number of students (N), and schools (n) for each group and the standard error of each percentage is also reported in Tables 3.16 to 3.19.

A further word of explanation is in order about both the types of credits and courses and also the numbers of credits and courses for which information is reported. The key to the different types of credits is as follows:

(a) Total--This is the total number of credits earned by a student in all the courses he took during his secondary school career, to the end of June 1976.

(b) Advanced--This term designates credits earned in courses at the advanced level of difficulty. Credits in advanced courses have been distinguished from credits in general level courses and basic level courses. Courses at the advanced level include Grade Thirteen courses and all courses in earlier grades that normally lead to, and are prerequisites for, Grade Thirteen courses.

(c) English--This category includes all credits earned in English courses, regardless of level of difficulty.

(d) Mathematics--All credits earned in mathematics courses, again regardless of level of difficulty, have been included here.

(e) Traditional Academic--A distinction has been made between courses in the traditional academic areas of English, French, other languages, history, geography, mathematics and science (biology, chemistry, physics); and courses in other areas, such as theatre arts, physical education, music, business and technology. This fifth category of credits includes only those earned from courses in the traditional academic subjects at the advanced and general levels of difficulty.

As regards courses, information was obtained for each SSGD student on the courses at the Grade Twelve level--and only at this level--that he took during 1975-76. Similarly, information was obtained for each SSHGD student on the courses at the Grade Thirteen level--and only at this level--that he took during 1975-76. The key to the tables on courses, Tables 3.17 and 3.19, is as follows:

(a) Total--This is the total number of courses taken by the student during the 1975-76 academic year.

(b) Languages--Courses taken during 1975-76 in English, French and other languages have been tallied in this category.

(c) History/Geography/Social Science--The 1975-76 courses counted in this tabulation include history, geography, and other social sciences such as economics, family living, and world politics.

(d) Mathematics/Science--As the name suggests, this category includes all 1975-76 courses taken in the fields of mathematics and/or science.

Three principles guided the choice of the numbers of credits and courses to be displayed in each table.

(a) In a number of instances the choice was dictated by the results obtained, for the variation in numbers of either credits or courses was too small to use numbers any different from those that appear.

(b) Where variation was great (e.g. Total Credits, Advanced Credits), the choice of values to be displayed was made with a view to revealing differences among groups, where differences existed.

(c) In addition, the choice of values for Total Credits was influenced by the fact that students are normally expected to accumulate 27 credits in order to qualify for an SSGD, and 33 for an SSHGD.

From the information on credits obtained for SSHGD-level students (Table 3.16), the following conclusions are apparent:

(a) From the fact that the percentage of students in the SSHGD group going on to postsecondary education is higher for each number of Total, Advanced, Mathematics, and Traditional Academic credits than it is for the group with other plans (e.g. further secondary school, employment, marriage, travel), it is apparent that the typical student in the SSHGD-POSTSEC group, as compared with the typical student in the SSHGD-OTHER group, has (from one to two) more credits in total, (from two to three) more credits in advanced level courses, (on the order of one) more credit in mathematics, and (from one to two) more credits in traditional academic courses.

(b) The students who were truant on the day the tests were administered (SSHGD-ABSENTEES) bear a closer resemblance to the SSHGD-OTHER group than to the SSHGD-POSTSEC group in the pattern of percentages for each different type of credit.

(c) The typical SSHGD-level student has earned five credits in English--this follows from the fact that approximately 70 per cent of SSHGD students, regardless of group membership, earned five English credits or more, but only about 25 per cent earned six or more. This fact implies that most students who achieve the SSHGD have taken one English credit per year during their secondary school careers.

(d) A majority (but the amount above 50 per cent is not large for Groups SSHGD-OTHER and SSHGD-ABSENTEES) of SSHGD-level students have earned five credits in mathematics, again implying that most students who reach Grade Thirteen have taken one mathematics credit per year.

(e) A majority of the total credits earned by SSHGD level students were in traditional academic subjects, and in courses at the advanced level of difficulty. In Group SSHGD-POSTSEC, the median number of advanced credits was 24 and the median number of credits in traditional subjects was 26. From this it follows that the typical student who graduated with an SSHGD in 1976 and had plans for postsecondary study had prepared himself for that study by taking five courses in traditional academic subjects at the advanced level of difficulty each year he was in secondary school.

(f) The relatively large number of students having less than the normally required 33 credits for an SSHGD merits some comment. The percentages of students in each of Groups SSHGD-POSTSEC, SSHGD-OTHER and SSHGD-ABSENTEES who had earned fewer than 33 credits by the end of June 1976 were 15, 26 and 31, respectively. It is possible that the majority of these students actually failed to earn an SSHGD in 1976 because they failed one or more Grade Thirteen courses. Unfortunately, the designation "SSHGD" in this study

refers to the principal's expectation for the student in April of 1976, not to the post-examination reality of June. The likelihood that this kind of April-misclassification was responsible, at least in part, for the fact that so many students failed to earn at least 33 credits is heightened by the fact that 17 per cent of the SSHGD-OTHER students reported plans to return to secondary school in September 1976 (see Table 3.2); for most, the reason for returning seems likely to have been to win the SSHGD that lay beyond reach in June 1976. It is also possible that some of the SSHGD students with fewer than 33 credits were among the relatively small group in the province who--due to special ability--are encouraged to earn the SSHGD in fewer than five years and without meeting the full SSGD requirements. Another possibility is that a number of SSHGD students had transferred into schools in the survey from outside the province. The records from these students' previous high schools would not necessarily be translatable into Ontario credits, and as a consequence, the reports that were made for this study were only of those credits taken in Ontario secondary schools. These students should not have been included in this tabulation, but if they were not "flagged" by their schools, we could not remove them.

The information presented on the courses taken by SSHGD-level students during 1975-76 (see Table 3.17) suggests the following conclusions:

(a) The difference between Groups SSHGD-POSTSEC and SSHGD-OTHER lies in the marked tendency for students in the former group to have taken more Grade Thirteen courses in total than students in the latter group. Also, there is a tendency, albeit less marked, for students in Group SSHGD-POSTSEC to have taken more Grade Thirteen courses in mathematics/science and fewer

courses in history/geography/social science than students in Group SSHGD-OTHER.

(b) Of SSHGD students with plans for postsecondary study, almost three-fourths were taking six or more Grade Thirteen courses in 1975-76, one of which was very likely a language, most probably English, and one of which was likely a mathematics/science. In addition, the chances were about even that a student in this group was taking a history/geography and a second mathematics/science course.

(c) The students who were absent from the testing had taken, on the average, fewer Grade Thirteen courses in total, fewer courses in languages and fewer courses in mathematics/science than the students who participated in the survey.

The picture that is described by the credit and course information on SSGD-level students is more complicated than that which has been described for SSHGD-level students. In large measure, this is due to the fact that there are four groups of students to contend with, not three. The following conclusions seem to hold on the basis of the results presented in Tables 3.18 and 3.19.

(a) Of the three groups SSGD-SEC, SSGD-POSTSEC, and SSGD-OTHER, a higher percentage of the first group (students who were planning to continue their secondary school studies in September 1976) than of either of the other two groups had accumulated each tabled number of total credits, credits in advanced level subjects, credits in mathematics courses, and credits in traditional academic subjects. Also, a higher percentage of students in this group were taking each tabled number of total courses (at the Grade Twelve level), language courses, history/geography/social science courses, and mathematics/science courses. The

group having the lowest percentage on each tabled number of credits and Grade Twelve courses of the various types was SSGD-OTHER, consisting of students who said they were leaving school to go to work, get married, etc. The group associated with percentages usually falling between those of groups SSGD-SEC and SSGD-OTHER was group SSGD-POSTSEC, consisting of students who said they were bound for further study at a tertiary institution.

(b) The relationship between the tabled percentages for the SSGD-ABSENTEES and those for the other groups is variable in the sense that for some numbers of credits (Grade Twelve courses) of a given type, the percentage for the absentees most nearly corresponds with the percentage for SSGD-POSTSEC, while for other numbers of credits (courses) of the same type, it most nearly corresponds with the percentage either for SSGD-SEC or SSGD-OTHER. This would seem to indicate that the absentees were students of all three types, those headed for postsecondary study, those headed for continued study in secondary school, and those with other plans. This interpretation conforms reasonably well with what one would expect if a more or less random assortment of SSGD students had chosen to be absent from the testing.

(c) Most students, regardless of group membership, had accumulated 27 credits or more by June 1976, thus meeting one of the requirements of the SSGD. The relatively small percentages of students in Groups SSGD-SEC, SSGD-POSTSEC, and SSGD-OTHER who failed to achieve this number (11, 13 and 17 per cent, respectively) may have been incorrectly designated by school principals as being eligible for the SSGD; or they may have failed a course or two which, if passed, would have qualified them for the SSGD; or they may have transferred into Ontario from another province or

from outside Canada and thus have had incomplete records of Ontario credits. A somewhat higher percentage of the absentees than of the other groups--a full 25 per cent--failed to achieve 27 credits.

(d) From the tabled percentages of students who had accumulated three or more, four or more, and five or more credits in English and in mathematics, it is clear that a large majority of the 1976 population of Anglophone SSGD students--on the order of 80 per cent--took one English credit per year during their secondary school careers, and that a somewhat smaller percentage, but more than 50 per cent, took one mathematics credit per year.

(e) The small percentages of students in Groups SSGD-OTHER and SSGD-POSTSEC having one or more, five or more and ten or more credits in courses at the advanced level of difficulty is noteworthy for it reflects the kind of streaming that occurs in secondary school on the basis of academic ability.

The foregoing results on credits and courses serve two functions. They better describe the groups of students within each of the Anglophone SSGD and SSHGD populations for which information of other kinds has already been presented. They also provide a limited picture of the courses taken by those 1976 students thought, at the time of sampling, to be eligible for either an SSGD or an SSHGD. At this point we are ready to compare these groups of students in terms of their scores on the achievement tests.

D. Achievement Tests

The tables of statistics that provide information on diversity of test performance within and among the five groups of students have been numbered 3.20 to 3.31. These tables contain five

selected percentiles from the distributions of scores for each group on each test. Some of the tabled results have been portrayed graphically in Figures 3.1 to 3.6. Note that in these figures, the performance of the SSHGD-POSTSEC group is used as a baseline against which to compare the performances of all other groups. Thus, the vertical axis in these figures is a measure, in units of the test score scale, of the difference between corresponding percentiles of the distributions of test scores for the SSHGD-POSTSEC group and the comparison groups. The vertical distance between the lines for any two groups represents the magnitude of the difference between corresponding percentiles for the two groups. (Further information of a technical nature about the tests, information that will help the reader interpret the test results, is provided in Appendices A1, A3, A5, A6, A7 and D.)

The results in Tables 3.20 to 3.31 and Figures 3.1 to 3.6 support several conclusions of a general nature:

(a) The rank order of the five groups of students in terms of achievement as measured by the tests is as follows: SSHGD-POSTSEC, SSHGD-OTHER, SSGD-SEC, SSGD-POSTSEC, and SSGD-OTHER. With only minor exceptions, this order is seen in the scores that were achieved on both the _Test of Reading Comprehension and Language Achievement (English)_ and its constituent subtests, and the _Writing Test_. These were the only two instruments applied to all five groups. The rank order SSHGD-POSTSEC and SSHGD-OTHER is maintained, with minor exceptions in the upper portions of the distributions of scores on the _Reading_ and _Listening Tests_ of the _Tests of French as a Second Language_, in all the tests administered only to SSHGD students. And the rank order SSGD-SEC, SSGD-POSTSEC, SSGD-OTHER holds for performance in the one test administered only to SSGD students, the _Test of Arithmetic and Basic Algebra_.

(b) The distributions of scores for the different groups overlap to a very considerable extent. As a consequence of this overlap, a substantial fraction of the highest scoring students in any group ranking low in average performance on a test did as well as, or better than, a substantial fraction of the lowest scoring students in a group ranking high in average performance.

(c) The performance of students in the SSGD-SEC group, the group that reported they were planning to return to secondary school, most of them for the purpose of taking Grade Thirteen, can be directly compared with the performance of SSHGD-level students on the <u>Test of Reading Comprehension and Language Achievement (English)</u> and the <u>Writing Test</u>. In its performance on the former test, the SSGD-SEC group more nearly resembles the two SSHGD groups than the other two groups at the SSGD level. The difference between the performances of the SSGD-SEC group and the two SSHGD-level groups on the English tests can be viewed as an indication of the incremental value of the Grade Thirteen year in developing the various aspects of language competence measured by these tests.

In addition to these general conclusions, several much more specific observations are worthy of mention.

(a) Historical comparison for the <u>Mathematics Achievement Test</u>. This test was written in 1968 by over 24,000 Ontario students enrolled in a SSHGD-level mathematics course entitled Mathematics A. Results from this administration of the test are reported in Table 3.26 and Figure 3.4, along with the results obtained from the administration of the test in this project. (The 1968 results were made available by Dr. D. M. Horn, who directed work on the tasks of developing the test and administering it in 1968.) It is of interest to note that the 1976 group composed primarily, but not

exclusively, of university-bound SSHGD students achieved scores about one mark higher than the 1968 group throughout the range of the distributions of scores for both groups. It is interesting to speculate about the origin of this difference, but our efforts in this regard have not generated any very plausible and testable hypotheses. It should be noted, however, that the SSHGD-POSTSEC group excludes all the SSHGD-level students who took the test but were not planning to embark on postsecondary studies in 1976-77. It is not known whether students not planning postsecondary studies were among the test takers in 1968 or not, but if they were, then a fairer comparison would involve both groups of SSHGD students tested in Project II. Indeed, if both these groups were combined, it can be seen from Figure 3.4 and Table 3.26 that the 1968-1976 difference would be negligible.

(b) Historical comparison for the Physics Achievement Test. This test was written in 1970 by SSHGD-level students of physics who applied to write the tests in approximately one-half the secondary schools of the province. The schools in which the test was administered were chosen at random. (Students in the remaining schools wrote a different form of the physics test.) Results from the 1970 administration are reported in Table 3.31 and Figure 3.6, along with the results obtained from its use in the present project. (The 1970 results were made available by Dr. A. Even, who directed work on the tasks of developing the physics test and administering it in 1970.) It can be seen by comparing the results for the 1970 group with those for group SSHGD-POSTSEC, that the latter group achieved from 3 to 4 fewer score points than the former, right across the range of the score distributions for both groups. The seriousness of this sharp decline is reflected by the fact that only approximately 37 per cent of 1976 students of physics

would score above the median of the 1970 group. The results from the 1970 and 1976 administrations of the test were studied by a committee of the Science Teachers' Association of Ontario (STAO), under the chairmanship of Dr. A. Even. This committee offered the following observations and comments on the results:

(i) The decline in performance seems to be associated with an increase in the occurrence of the following student faults, as revealed in a detailed examination of responses to individual test items by both groups of students:

- misconceptions and confusions (e.g. force equation used instead of velocity equation; angular acceleration confused with linear acceleration; ignoring one of two components in a motion problem);

- making unwarranted assumptions or reading test questions carelessly; and

- failing to consider all the alternative answers to a question.

(ii) The decline in performance is also associated with a decline in speed of test taking, as reflected by an increase in the 1976 results over those for 1970 in the number of students failing to reach items appearing later in the test.

(iii) In the years between 1970 and 1976, a number of changes were introduced into Ontario education that may may be responsible for the decline:

- The introduction of the Credit System in 1971 had the effect of reducing the amount of class time allotted to the Grade Thirteen physics course. In some Ontario secondary schools, the amount of instructional time for physics dropped from five 50-minute periods per week before the introduction of the Credit System to five 35- to 40-minute periods after the system came into effect. In other schools, the before-Credit-System allotment of instructional time for physics was seven 35- to 40-minute periods per week but the Credit-System allotment was only five 35- to 40-minute periods.

- As a consequence of the reduction in instructional time, teachers have been forced to allot less time to certain topics. For example, the topic "optics and waves" is included in the curriculum guidelines of both the Grade Eleven and Grade Thirteen physics courses. Because of this duplication, many teachers of the Grade Thirteen course treat optics and waves very lightly, preferring to spend precious instructional time on other topics, such as mechanics. In addition to this kind of effect, the reduction in instructional time for physics has created the feeling, apparently widespread among physics teachers, that physics cannot now be treated with the same rigor that it could before the introduction of the Credit System.

- Physics teachers are of the opinion--but evidence presented in the Project III report tends to contradict this opinion--that a higher proportion of SSHGD students take physics now than before the introduction of the Credit

System. If this is the actual present state of affairs, it may be due, in part, to the reduced class time now required to earn a physics credit. If the fraction of students taking physics is truly higher, then it is possible that the typical student of physics in 1976 is somewhat less able academically than his 1970 counterpart.

(iv) The STAO committee notes that there has been a shortage of Grade Thirteen physics specialists in recent years; hence the quality of instruction in Grade Thirteen physics may have declined over the past six years.

(v) The semester system was followed by very few schools in 1970, and then only on an experimental basis. It is followed by many schools today. (Of the 53 schools in the Anglophone survey, only 31 were on the regular full-year system; most of the remaining 22 schools operated on a variety of semester systems whereby students earned either full credits or half credits or a mixture of both for a semester's work in a subject. One school ran on a trimester system.) Students in any of these 22 schools who took physics in the first semester and who were tested in the second semester would have had time to forget much of the detailed knowledge of physics required to do well on the test. This group, unfortunately, was not identified and treated separately from the group who were either taking physics in unsemestered schools or taking it during the second semester when the test was given. For this reason, the effect of forgetting by students who took the first semester courses could not be estimated.

(c) International comparisons for the _Tests of French as a Second Language_. Comparisons having somewhat limited validity were possible between the performance of Ontario students and the performance of students sampled in an international study of achievement in French. (See Carroll, 1975, for a description of the study and the results that were obtained.) The comparisons have only limited validity because either the tests employed in the international study were modified somewhat for use in Project II, or the sample of Ontario students chosen to write a particular test was too small to yield satisfactory results. The tests that were modified were the _Reading Test_ and the _Listening Test_. The content of the _Reading Test_ was altered in several places; the _Listening Test_ was shortened and the procedure followed in administering it was changed at one point in the test. (For a detailed description of the changes see Appendix A3.) The probable net effect of these changes on test performance is difficult to predict. Because the _Listening Test_ used in this study contained fewer items than the one used in the international study, it would be expected that the scores obtained in the Ontario application of the test would be smaller than they would have been had the full test been used instead, but the change in administrative procedure, which was to play part of the tape for the _Listening Test_ twice instead of once, should have had the effect of enhancing scores in comparison with what they otherwise would have been. Which effect, the one to decrease scores or the one to increase them, would likely be stronger is impossible to say. Similarly, it cannot be said with assurance that the wording changes made in the _Reading Test_ would be either to the advantage or to the disadvantage of students, but because the changes were made by a committee of individuals knowledgeable about the teaching of French in Ontario secondary

schools, it seems likely the changes would have been to the students' advantage.

The tests for which the Ontario sample was too small to yield satisfactory results were the Writing Test and the Speaking Test. For practical reasons noted in Chapter Two (and Appendix A3), only a small number of students were assigned to take these instruments; absenteeism made the number who actually wrote the tests even smaller. The results that are reported for the Writing Test and the Speaking Test are statistics that describe the unadjusted distributions of scores on the tests for all the students who took them, regardless of whether they were planning to go on to postsecondary studies in 1976-77 or not. How these scores should have been adjusted to compensate for the effects of absenteeism could not be determined by the same means used for adjusting scores on the other tests because of the small sample size; hence the results for these tests do not necessarily reflect the level of achievement that could be expected for the population of Anglophone Grade Thirteen students taking French.

Results for the French Reading Test and the Listening Test appear in Tables 3.27 and 3.28, and in Figure 3.5. Results for the Writing Test and Speaking Test are reported in Tables 3.29 and 3.30. In the tables for each test, the mean scores reported by Carroll (1975, pp. 164-165) for each of seven or eight other countries are also presented. (The reader should note in the tables for the Reading Test and the Listening Test that the average reported for Ontario is an estimate of the median score for the province, whereas the averages reported by Carroll are means. If all the score distributions on which these statistics are based were symmetrical, then the mean and the median would be identical. To the extent that a distribution is skewed, either positively or negatively, the mean of

the distribution is either higher or lower than the median. This possible discrepancy between the mean and the median constitutes yet another reason why comparisons between the results Carroll reported for the Reading Test and the Listening Test and the results obtained in the present study should be treated very skeptically.) These results suggest the tentative conclusion that Ontario Grade Thirteen students performed reasonably well on the Tests of French as a Second Language in comparison with students in the United States. It must be remembered, however, that the Ontario students were most likely a year older on the average when they took the tests than the U.S. students were, given that the Ontario groups were in Grade Thirteen and the U.S. group in Grade Twelve. In comparison with the students of other countries, Ontario students are seen to have done less well than some and better than others. In view of the hazards involved in treating these results more seriously than this, no further comment is offered here.

## 1.3 Variation in Marking Standards

One of the issues that Project II was designed to address is that of variations in marking standards among schools.

### A. Procedure

Regression analysis was the basic technique used in this part of the study. The analysis provided a mathematical way to "translate" test scores from the scale used in the reporting of test results to the scale used by teachers when they reported course marks. These "translated" or "estimated" or "predicted" marks (based on the test scores) could then be compared with the "observed" marks, those actually awarded by the teachers of the courses related to the tests. The analysis consisted of selecting

a course for which there was a related achievement test (e.g. SSHGD-level physics), and forming a pooled within-school estimate of the coefficient for the linear regression of marks for the course on scores for the test. (If more than one test were related to the course, multiple linear regression was used.) This regression equation was then used to estimate a mean course mark for each school; input to the regression equation was the mean score for each school on the predictor test. The resulting predicted or adjusted mean mark and the observed mean mark for each school were the basic data used in our study of variation in marking standards.

The issue of primary importance at this point is the interpretation of the predicted-observed mean mark difference. Under what circumstances could it be argued that this difference reflects variation in marking standards? One such circumstance requires a good "fit" between the content of a test and the content of the course for which marks are being studied. If the course under examination covered exactly the same content in all schools, and if the test covered this same content, it would seem reasonable to say that the predicted-observed mean mark difference was due to variation in marking standards from school to school--assuming, of course, that the sample sizes for each school were large enough so that unreliability in the test scores and marks could not have much, if any, influence on the mean test score and the mean mark for a school. This circumstance almost certainly fails to jibe with those associated with the present study. It would be impossible to assert that the courses for which we had marks covered the same content in all the schools that participated in the study; furthermore, the results of the test appraisals (see Appendices A1 to A9) provide evidence that the coverage of course content by the tests was not comprehensive.

A second circumstance under which it could be argued that the difference between the observed and predicted mean marks for a school reflects variation in marking standards does not require that courses in different schools cover the same content and it

does not require a perfect fit between test coverage and course content. What is required by this circumstance is that the correlation between marks and test scores should be uniform over schools and that the coefficient for the regression of marks on test scores should also be uniform over schools. This condition should not be blithely assumed (Goldman, Schmit, Hewitt & Fisher, 1974), but in the present study we had no choice. The number of students for whom marks and test scores were available was too small for some schools to provide sufficiently stable estimates of the correlation coefficients and the regression coefficients specific to these schools. Consequently, we resorted to the use of the regression coefficient based on the pooled within-school variance and covariance of marks and test scores. To the extent that the assumption of homogeneity of both correlation coefficients and regression coefficients is valid for the present study, then by the argument associated with the second circumstance, it can be said that the observed-predicted mean mark difference reflects variation in marking standards.

A third circumstance in which it could be said that the difference between the observed and predicted mean marks reflects variation in marking standards requires no consideration of the "fit" between test content and the content of the related secondary school course. The fit of interest is, instead, between the test and the expectation of the postsecondary institutions who receive the students from the secondary schools. Insofar as the tests can be said to measure knowledge that is important to the postsecondary institutions, then the marks assigned in secondary school courses are surrogate measures of this knowledge, measures that are available in the absence of test scores. Here again, we conclude that the difference between predicted and observed mean marks reflects variation in marking standards from the point of view of the postsecondary institution. Homogeneity of regression would not seem to be a necessary requirement for the predicted-observed mean mark difference to be interpreted as variation in marking standards in this third circumstance, but it is a requirement that was introduced in our analysis. (it must be admitted that school marks may well be based on, contain

information about, and be predictive of characteristics of the students which are relevant to their postsecondary success but which are not revealed by the test scores.)

One part of the study we made of the difference between the observed and predicted mean marks, our index of variation in marking standards, was correlational in nature. Our purpose was to investigate consistency in the patterns of course marks awarded. We wondered whether or not the difference between the observed and predicted means for a course correlated with the predicted mean for that same course, and whether or not the sign and magnitude of the coefficient of this correlation would be consistent over different courses. We also wondered whether or not the difference between the observed and predicted means for one course would correlate with the difference for another course.

The second part of our analysis focussed on the magnitude of the discrepancies found between the observed and predicted means. This was done by forming a distribution of differences for a given course, and computing and reporting selected percentiles of the distribution. We chose to report the 25th, 50th and 75th percentiles of this distribution. These percentiles were chosen to give an indication of the typical negative deviation (25th percentile), the typical positive deviation (75th percentile), and an overall average deviation (50th percentile). By themselves, however, these percentiles would be difficult to interpret. To judge whether a typical deviation of one kind or another is large or small requires a comparison figure of some sort. The standard deviation of marks would seem to provide a reasonable comparison figure, particularly if this standard deviation refers to the distribution of marks that <u>includes</u> variation among schools in observed mean marks (that is, what can be regarded as variance due to variation in marking standards). If a typical difference from the distribution of differences between observed and predicted mean marks were small relative to the standard deviation of the marks distribution, then it would be reasonable to conclude that the variation in marking standards is relatively unimportant. Thus a student could not expect to alter his

standing in the mark distribution very much just by changing schools. On the other hand, if a typical deviation were almost as large as the standard deviation of marks, then there would appear to be cause for much concern about variation in marking standards. In such a circumstance, a change of school could have a marked effect on a student's standing in the overall distribution of marks.

The procedure as outlined for studying variation in marking standards suffers from at least one technical limitation that may be viewed as more or less serious: the regression of marks on test scores is presumed to be linear. This presumption, while not necessarily true, has been found to hold tolerably well in many previous studies of school marks and test scores.

## B. Pooled Within-School Correlations

In this study of variation in marking standards, test scores were used to compare the marks assigned by the different schools. The argument for this is that equivalent test performances should be associated, on the average, with equivalent marks, and that differences in test scores should be associated with differences in marks. This argument implies that test scores should have positive and substantial coefficients of correlation with the marks awarded to the students in a given school. To assure ourselves that this was indeed true for the tests used in the present study, coefficients of correlation based on the pooled-within school variations and covariations of test scores and marks were computed. They are reported in Table 3.32. The correlation coefficients that were obtained were all substantial and within the range of coefficients usually found in studies of school marks and achievement test scores.

## C. Correlational Evidence on Marking Standards

The regression procedure outlined previously was implemented to obtain a predicted, as well as an observed, mean mark for each school for each course to which a test related. These means were based on the results--marks and test scores--for those students within each school for whom we had obtained marks and who had taken the appropriate tests. Summary statistics pertaining to the regression analyses that were done are reported in Appendix F, Tables F.1 to F.3.

Coefficients of correlation between observed mean marks and the predicted mean marks are reported in Table 3.33 for various SSHGD and SSGD courses. It will be noted that two correlation coefficients are reported for each course. One was based on all the schools for which there were some relevant data; the other was based on only those schools for which relevant data were available on four or more students. The correlation coefficients calculated from the "trimmed" data were somewhat smaller, in general, than the correlation coefficients calculated from the untrimmed data. With the exception of two courses, the coefficients computed from untrimmed data were 0.30 or larger. What these results imply is that in schools where students did poorly on the achievement tests, teachers tended to award marks that were correspondingly low, whereas in schools where students did well on the tests, teachers tended to award marks that were correspondingly high. The tendency cannot be described as strong, although the correlations for SSHGD French and physics were substantial, but the tendency was consistently positive. It is also worthy of note that the mean marks were not as highly correlated with the predicted mean marks as individual students' marks were with predicted individual marks (compare the correlations in Tables 3.32 and 3.33). In other words test scores were more accurate predictors of individual student marks within a school than of across-school mean marks for test-related courses. Can variation in marking standards be responsible for this?

Other correlation coefficients of interest are reported in Table 3.34. These describe the relationship between the mean mark that was predicted from test results and the difference between the observed and predicted mean marks. Without exception these correlation coefficients are negative. A negative correlation means that if the predicted mean mark for a school was relatively low, the marks that were assigned in that school tended to be higher than predicted; on the other hand, if the predicted mean mark for a school was high, the tendency was for the marks assigned in that school to be lower than predicted.

The correlational results that have been presented thus far seem, on reflection, to be about what one would expect. In general, teachers are sensitive to the achievement levels of their students and assign marks accordingly, hence the positive correlation between observed and predicted mean marks. On the other hand, it is probably an unwritten, perhaps even unspoken, rule in Ontario schools--schools anywhere, for that matter--that not every student in a course can fail, no matter how poorly all the students in the course achieve; similarly, no matter how well all the students in the course achieve, not every one of them can be awarded a top mark. Application of this rule would have the effect of reducing the average mark awarded in schools where student achievement was high to a level below that which would be expected from test results, and of increasing the marks awarded in schools where student achievement was low to some level above that which would be predicted from test results.

The final step in our correlational study of differences between observed and predicted mean marks was to intercorrelate the differences for different courses. The results of this part of the study are reported in Tables 3.35 and 3.36. The correlations for SSHGD courses (Table 3.35) are consistently positive although most are relatively small and two are very nearly zero. The correlations for SSGD courses (Table 3.36) are, with one exception, also positive. It is also interesting to note that the highest correlation in both tables is between the observed and predicted mean difference for the SSGD English course at the

advanced level of difficulty and the difference for the SSGD mathematics course, also at the advanced level of difficulty.

The finding of positive, if relatively small, correlations between observed and predicted mean differences for different courses can be interpreted as follows. There is a tendency, albeit relatively weak, for schools associated with large differences in one course to be associated with large differences in another course. Similarly, schools associated with small differences in one course tend to have small differences in other courses. If the difference between observed and predicted mean difference were due in part to variation in marking standards, as hypothesized, the correlations between the differences for different courses could be accounted for by the added, and not unreasonable, hypothesis that a hard school is generally hard and an easy school generally easy, regardless of course.

D. Extent of Variation in Differences

To provide an indication of the variation over schools in the difference between the observed and predicted mean marks, the distributions of the differences was formed for each course. Then the 25th, 50th, and 75th percentiles of each distribution were computed; they are reported in Table 3.37. It can be seen that the median deviation (the difference between observed and predicted mean marks) is relatively small. This means that on the average, over all the schools in the study, the marks that are assigned are close to what would be predicted from test scores. This is not surprising; the regression method used to obtain predicted mean marks ensures that the median difference between the predicted and observed mean marks will be near zero; in fact, the mean difference would be exactly zero.

Greater interest attaches to the 25th and 75th percentiles of the distribution of deviations. They constitute typical negative and positive deviations; they indicate the magnitude of the decrement or increment a student can expect to receive in his

work just because he attends a school that assigns higher or lower marks than would be predicted from test results. It can be seen from the figures presented in Table 3.37 that the typical decrements and increments represented by the 25th and 75th percentiles are not inconsequential. These "typical" differences between observed and predicted mean marks range from approximately 0.2 to 0.4 of a standard deviation of the distribution of marks, depending on the course. (Note that this standard deviation is for the overall distribution of marks, the one that includes the between-school variance in observed mean marks. These numbers were taken from Tables F.4 and F.6 of Appendix F.) In a course for which the standard deviation of marks was 10, a student who attended one of our "typical" hard or soft schools would expect to earn from 2 to 4 fewer or more marks than <u>he should</u>. If the effective range of the distribution of marks were from either 35 or 40 to either 95 or 100, and this range seems reasonable in view of the means and standard deviations of mark distributions that are reported in Tables F.4 and F.6 of Appendix F, then the magnitude of the typical differences between the observed and predicted mean marks that we have chosen for study would seem relatively small. Certainly a student would be better advised to try to improve his mark through increased effort than through a change of school.

Another view of the effect that a difference as large as 0.4 of a standard deviation can have in a student's expected standing in the provincial distribution of marks for a course can be obtained as follows: Let us imagine that a student is judged by the test score he obtained to be "average". This implies that he should be awarded an average mark for the related course. (To see what the mean marks for the various courses were for those students in the survey, consult Tables F.4 and F.6 of Appendix F; however, these records are not needed in the present discussion.) This also implies, provided the provincial distribution of marks for a course is approximately symmetrical, that the student should stand at the 50th percentile of the distribution. Suppose, however, that he were to attend a school where the difference between the observed and predicted mean

marks was so large that he could expect to be penalized 0.4 of a standard deviation of the mark distribution. This would mean, all other things being equal and assuming that the distribution of marks was approximately normal, that the student's expected percentile rank in the distribution would be 34, not 50 as it should be. On the other hand, if he were to attend a school where the difference between the observed and predicted mean marks was so low that he could expect to be rewarded by 0.4 of a standard deviation of the mark distribution, then instead of standing at the 50th percentile, he could expect to stand at the 66th percentile of the mark distribution. The magnitude of the shift in percentile rank in this example is extreme in the sense that it involves the largest difference due to variation in marking standards that is to be found in Table 3.37. If the penalty or reward were only 0.2 of a standard deviation of the mark distribution--this was the smallest "typical" difference reported in Table 3.37--then the shift in percentile rank for the average student would be from 50 to either 42 or 58. (It should be noted that the shifts in percentile ranks in the foregoing examples are the largest that are possible for a difference of a given size, as measured in terms of the standard deviation of the mark distribution. This is because the examples are based on an average student, one standing at the mid-point of the distribution. Had the student been above or below average, then the shift in percentile rank would have been smaller on the average.)

## E. Conclusions about Variation in Standards

Having reached the end of our study of marking standards, what can we say? We have found that the predicted mean mark for a school correlated positively with the observed mean mark, although this correlation was weaker than the pooled within-school coefficients of correlation between individual student marks and predicted student marks. We have also discovered that the difference between the observed and predicted mean marks for a school was negatively correlated with the predicted mean mark for

the school, and that the difference for one course was positively correlated with the differences for other courses. Finally, we have demonstrated that "typical" positive and negative differences between observed and predicted mean marks were substantial enough to affect a student's standing in the overall mark distribution of the province. None of this proves that the differences we have studied are wholly or even substantially due to variation in marking standards, although the hypothesis that such variation is a contributing causal factor certainly must be entertained seriously. What the results do show is that schools vary systematically in the marks they assign, for whatever reason, and that although this variation is sizeable enough to shift a student's location in the distribution of marks quite substantially, it probably is not large enough, relative to the overall range of marks assigned in a course, to justify his changing schools for the purpose of getting a higher mark without increased effort. On the other hand, if positions in postsecondary educational institutions are awarded competitively on the basis of the marks a student earns in secondary school, then it must be concluded that the students from some schools have a distinct advantage over the students from other schools simply because the marks awarded in some schools tend to be higher than the marks awarded in other schools.

## F. Secondary Results

In the course of the analyses performed for the study of marking standards, some results that may be of general interest emerged as by-products. The statistical evidence that supports these results is presented in Tables F.1 to F.3 of Appendix F.

(a) The Writing Test and all three parts of the Test of Reading Comprehension and Language Achievement (English) made significant contributions to the prediction of marks in English, regardless of the level of English course that was studied (see Table F.1). This result implies that the four measures tap somewhat

different aspects of language competence, each of which is important for success in SSGD- and SSHGD-level English courses. The regression coefficient for the Writing Test in all analyses was approximately 0.25, about one-half the size of the coefficients for the other three variables, or smaller. This means that each increase of one mark in Writing Test score would add about one-fourth of a mark to a student's estimated English course mark, whereas each increase of one mark in score on the reading comprehension part or either of the two language achievement parts of the Test of Reading Comprehension and Language Achievement (English) would add one-half of a mark, or more, to the student's predicted English course mark.

(b) The level of correlation achieved between tests and English course marks is of some interest. The average coefficient of correlation--averages of correlation coefficients were computed using Fisher's Z transformation--between scores on the Writing Test and marks was 0.43. For the three parts of the objective test, the average correlation coefficients with marks were as follows: reading comprehension part, 0.36; first language achievement part, 0.37; second language achievement part, 0.37. Obviously, the Writing Test was the best predictor of the four, but the difference was small. In combination, the four scores correlated 0.53 on the average with English course marks, a substantial improvement over the correlation for any one part alone. The substantial contribution of the Writing Test to the prediction of English course marks is illustrated by the fact that the average multiple-correlation between course marks and the three parts of the objective test was only 0.47.

(c) The Reading and Listening Tests of the Tests of French as a Second Language proved to be excellent predictors of course marks in SSHGD-level French. The multiple

correlation between these tests and course marks was 0.69.

(d) The coefficient of correlation between scores on the Mathematics Achievement Test and the average of marks on two SSHGD-level courses in mathematics, the course in calculus and the one in functions and relations, was 0.65. This coefficient is somewhat lower than those reported by Khan (1967) between a forerunner of the Mathematics Achievement Test and marks on the 1967 departmental examinations for Mathematics A ($r = 0.73$) and Mathematics B ($r = 0.78$). One would expect the correlations between a test and a departmental examination to be somewhat higher than the correlation between a test and teacher marks, for the former correlation is not attenuated by the subjective or instruction-specific factors that influence the marks that teachers assign. Khan did find that the coefficients between the predecessor of the Mathematics Achievement Test and Easter marks that teachers in three large secondary schools had assigned in Mathematics A and Mathematics B were somewhat lower at 0.71 and 0.66, respectively. Any comparison between these coefficients and the one obtained in the present study is made difficult by the fact that Khan did not have access to final teacher marks, and he did not sample widely among schools. Nevertheless, it seems safe to conclude that the correlation between teacher marks in SSHGD-level mathematics courses and scores on the Mathematics Achievement Test was not substantially less in 1976 than it had been in 1967.

(e) The correlation coefficient between marks in the SSHGD physics course and scores on the Physics Achievement Test was 0.60. This may be compared with the coefficient reported by Khan (1967) of 0.64 between a forerunner of this test and the Easter marks in physics assigned by teachers in three large secondary schools.

Khan also reported a correlation of 0.73 between scores on the forerunner test and scores on the last Ontario departmental test of physics. It seems reasonable, on the basis of these results, just to repeat the conclusion that was drawn from the correlational evidence available on the mathematics test; the correlation between teacher marks in the SSHGD-level physics course and scores on the Physics Achievement Test was not substantially less than it had been in 1967.

(f) Coefficients of correlation were computed between scores on the Test of Arithmetic and Basic Algebra and marks in SSGD mathematics courses of two different types--the foundations course at the advanced level of difficulty and the applications course at the general level of difficulty. The coefficients for these two courses, respectively, were 0.61 and 0.47. Although the test assessed only basic skills, it seems that variation in performance of these skills was more closely related to variation in marks on the foundations course than in marks on the general course. Why this should be is a matter left for the reader to ponder.

The foregoing correlational results, presented as a by-product of the study of school marking standards, were obtained through application of a statistical procedure in which the appropriate within-school variances and covariances were pooled over schools. This approach to the study of correlation between test scores and marks is the best, in our opinion, in the case where individual students serve as the units of analysis, because it provides an assessment of the degree of correlation possible when the contaminating effect of variation in school means on the variables involved, variation due to differences in marking standards or to some other factor, has been removed. Those readers who, for whatever reason, would like to study

correlations containing the variation among school means in addition to the within-school variance among students are referred to in Tables F.4 to F.7 of Appendix F. These tables contain means, standard deviations, zero-order intercorrelation coefficients and sample sizes for all the tests and school marks obtained on SSHGD students (Tables F.4 and F.5) and SSGD students (Tables F.6 and F.7) in Anglophone schools.

## 1.4 Factors Associated with Educational Achievement

The third and final purpose of the SSGD/SSHGD survey of Anglophone students was to identify factors associated with school success as measured by the achievement tests used in this study. In addition, a study was made of factors associated with future plans as reported by students in response to one of the questions in the Student Questionnaire.

### A. Procedure

The procedure followed in this analysis was similar to the one followed in the study of variation in marking standards and described in the previous section of this report. Of course, different variables were involved. In this part of the study our objective was to identify factors (predictor variables) associated with school achievement as measured by the tests used in the study, and with future plans as reported in the Student Questionnaire. The factors included in our study were as follows: (i) variables based on data obtained via the Student Questionnaire: the age and sex of the student, language spoken in the home, and education and occupation of the parents/guardians; (ii) variables based on program information obtained from the schools; for SSGD students, these were: total credits earned in secondary school to the end of June 1976, total credits in English, total credits in mathematics, total credits in courses at the advanced level of difficulty, and total credits in courses at the general level of difficulty; for SSHGD students, the

variables included: total credits earned in secondary school to the end of June 1976, total credits in English courses, total credits in mathematics courses, total number of SSHGD courses that were taken during 1975-76, and total number of SSHGD courses taken in languages, total number in history/geography/other social sciences, total number in mathematics/science, and total number in other courses; (iii) variables related to the school: size of school, type (collegiate vs. other), geographic location (Central, Southwestern and Western vs. the rest of the province), size of community (large city and suburban vs. small city and rural), organization (regular academic year vs. semester system or some other system), and length of instructional periods (class periods of 35 to 45 minutes in length vs. longer class periods).

Some adjustments were made to the data derived from the Student Questionnaire before they were entered into the analysis. If a student failed to report his/her sex, he/she was assumed to be female; if a student failed to give his/her birthdate, or if an age less than 15 or greater than 22 years was reported, he/she was assigned the mean age for the group, either SSGD or SSHGD, whichever; if the language spoken in the home was not supplied, it was assumed that the language was English; if no level of education were given for a parent/guardian, it was assumed that the parent/guardian had finished secondary school; if the occupation of the male parent/guardian had been omitted, or if the parent/guardian were reported as deceased, retired, etc., the occupation level was set to 3 on the Blishen scale; if the female parent/guardian were listed as having an occupation other than housewife, this variable was coded one, otherwise it was coded zero; if the total credits given for the student were fewer than 20 for SSGD students, fewer than 27 for SSHGD students, or if it were missing altogether, the record for the student was dropped from the data file. By this latter step approximately three per cent of SSGD records (out of 1794) and approximately five per cent of SSHGD records (out of 3751) were deleted. The adjustments made to the occupation of male parent/guardian affected approximately 11 per cent of both SSGD and SSHGD

records; all other adjustments affected approximately one per cent of the records or less.

The next step was to compute variances for all variables and the intercorrelation coefficients among variables using pooled within-school variances and covariances. This step in the analysis involved all the predictor variables described previously for both the SSGD and SSHGD groups, and in addition, the following variables: future plans, total score on the Test of Reading Comprehension and Language Achievement (English) (available for all students), score on the Writing Test (for those SSGD and SSHGD students who had taken it), score on the Test of Arithmetic and Basic Algebra (for those SSGD students who had written it), and score on the Mathematics Achievement Test (for those SSHGD students who had written it).

Several multiple regression analyses were then performed using score on a test or the variable of future plans as the dependent variable and selected members of the set of predictor variables as independent variables. This was to identify the smallest reasonable set of predictors for which the multiple correlation coefficient with a test score or with future plans was as high as possible.

Once a set of predictor variables had been identified, the regression function based on the pooled within-school variances and covariances was used to predict--for each school--a mean for the variable of future plans and a mean for each test included in the subsequent step of the analysis. This prediction was done in the SSGD group for score on the Test of Reading Comprehension and Language Achievement (English), score on the Writing Test, score on the Test of Arithmetic and Basic Algebra, and the future plans of the student. In the SSHGD group, the prediction of a mean for each school was done only for score on the Test of Reading Comprehension and Language Achievement (English) and the variable of future plans. (The Writing Test and the Mathematics Achievement Test were not included at this stage.)

The final step in this analysis was to compute, for each school, a residual for each test that had been retained in the analysis to this point, and one for future plans. A residual consisted of the difference between the predicted mean for a test or for the plans variable and the observed mean for the test or the plans variable. The residuals for each test and for plans were intercorrelated among themselves; they were also correlated with other variables for each school.

B. Individual Student Factors Related to Achievement Within Schools

The results of the regression analyses performed on the pooled within-school variances and covariances are reported in Tables 3.38 to 3.45. (The variances of all variables studied in these analyses and the matrices of correlation coefficents among the variables are presented in Appendix I.) By this stage of the analysis several program variables (predictors) had been excluded because they overlapped substantially with the program variables that were retained in the analysis that is reported here. The predictors that were retained were: age and sex of student, language spoken in the home, educational level of parents/guardians, occupational level of parents/guardians, total number of English credits, and total number of mathematics credits earned in secondary school.

Consider the results for the SSGD sample:

(i) From the results presented in Table 3.38, it can be seen that the predictors of performance on the Test of Reading Comprehension and Language Achievement (English) having regression coefficients that were significantly different from zero were: age, sex, educational level attained by both parents/guardians, occupational level of the father/male guardian, and the total number of credits taken in English and mathematics courses during secondary school. Of these, the only variables subject to much, if any, change by the conscious effort of the student are the

program variables. A student could expect to improve his performance on this test by about one mark for each additional credit in English or mathematics that he acquired.

(ii) The results for the Writing Test (Table 3.39) tend to duplicate those for the Test of Reading Comprehension and Language Achievement. The factor both having the most effect on writing and lying under the student's control is number of credits in English.

(iii) The results for the Test of Arithmetic and Basic Algebra (Table 3.40) again demonstrates the power of time spent learning a subject. The largest regression coefficient is for the total number of credits in mathematics. For every credit taken in mathematics, a student could expect to improve his test score by approximately four marks.

(iv) The interesting result in the analysis of the variable of future plans (Table 3.41) is the fact that language of the home is a significant predictor here, whereas it was not significant in the other three analyses. Students from homes where English is spoken are less likely to have plans to continue their studies at both the secondary and postsecondary levels than students from homes where another language is spoken.

The results from the regression analysis performed on the SSHGD data (Tables 3.42 to 3.45) generally corroborate the results from the SSGD analyses. Students can expect to improve their test scores on the language tests by taking English courses, and on the Mathematics Achievement Test by taking mathematics courses. It is also interesting to note that the language spoken at home is a significant predictor of scores on the Test of Reading Comprehension and Language Achievement (English); students from homes where English is spoken were predicted to have a two mark advantage on this test over the students from non-English speaking homes.

What have we found? The answer must be that we found pretty much what one would expect. Regardless of which school a student goes to, he/she will tend to achieve better on the tests administered in this study, and he/she will also tend to have plans to continue his/her education if he/she comes from a home where the parents/guardians have attained a high level of formal education and where the father/male guardian holds a higher status job. But these factors are presumably out of the student's control. He/she can influence his/her achievement only by taking more of the right courses. In the case of the tests that were included in this study, these courses would be in English and mathematics.

### C. School Factors Related to Achievement

In this part of the study, the residual difference between the mean test score achieved by the students in a school and the mean test score that was predicted for the school from background and program variables--the results of this prediction were described in the preceding section--was the subject of investigation. This mean difference may be regarded as an estimate of the effect that is associated with the school and which cannot be explained from the backgrounds of the students in the school or from the number of English and mathematics credits taken by the students during their secondary school careers. In the present discussion these effects are referred to as "school effects".

Three questions arise regarding the school effects we obtained: (i) Are the school effects significant? That is, is the variance over schools of the difference between the observed and the predicted mean significant? (ii) Are the school effects from one test related to those for another test? (iii) Are the school effects related to anything else that we know about the school?

Evidence is presented in Table 3.46 on the question of significance. The variance associated with "school effects" was compared with the residual variance obtained from the regression analyses reported in the previous section. When the relative magnitudes of these variances are judged with reference to appropriate statistical tables, it can be concluded that the effects, although small, are statistically significant.

Evidence on the second question was obtained by correlating the different school effects obtained for the SSGD students and the two obtained for SSHGD students. The observed correlations are reported in Table 3.47. The correlations are consistently positive, suggesting that whatever it is that produces a school effect, that factor tends to affect the achievement in a school more or less generally across different subject areas, and to reveal itself in students' plans as well as in their tested achievement.

Finally, we tested the degree of association between our school effects and the six school variables of size, type (collegiate <u>vs.</u> other), geographic location (Central, Western and Southwestern Ontario <u>vs.</u> the rest of the province), setting (urban <u>vs.</u> rural), organization (regular academic year <u>vs.</u> semester system or some other type of organization), and period length (35 to 45 minutes <u>vs.</u> longer periods). One significant association was found, an association between school size and the school effect for future plans of students at the SSGD level. There was a tendency for small schools to be associated with negative residuals on this variable, for large schools to be associated with positive residuals. This suggests that there was a tendency for fewer SSGD students from small schools to go on to Grade 13 and postsecondary study than would be expected from the backgrounds of the students in those schools and the number of English and mathematics credits they had taken. Correspondingly, there was a tendency for more of the SSGD students attending large schools to go on to Grade 13 and postsecondary study than would be expected from their backgrounds and the number of English and mathematics credits they had earned in secondary

school. However, the fact that this school size/future plans association was the only significant association among the 32 that were tested for significance leads us to believe that it was simply due to chance.

Our study of relation between school factors and the measures we had of school effects leads us to a not altogether satisfying conclusion: what school a student attends <u>can</u> affect his achievement levels as we measured them and his future plans; the effects schools have are real and variable. But what factors are the significant creators of those schools effects--this we do not know. All we can say at this point is that factors related to school size, school type, geographic location, school setting, organization, or period length do not appear to be the significant ones, at least as measured here.

## 2. FRANCOPHONE STUDENTS

In the conduct of the survey of Francophone students there was the same cause for concern about test validity as existed in the conduct of the survey of Anglophone students. The tests that were administered in this survey were selected by a committee of Francophone educators and they were subjected to appraisal in the same way that the tests for Anglophone students had been appraised. The general conclusions that can be drawn from the effort expended in validating the tests for Francophones are the same as were drawn about the tests for Anglophones. Instead of repeating these conclusions here, the reader is referred to subsection 1.1, A of the preceding section of this report, where the conclusions are presented for the tests administered to Anglophone students.

There is also a need for the reader of the results concerning Francophone students to be aware of the nature and purpose of the tests used in Project II. This is necessary if the test results are to be properly interpreted. Again, there is a

discussion of the nature and purpose of the tests used in this study in the preceding section of the report. Readers who omitted that discussion are encouraged to retrace their steps and read the relevant paragraphs in subsection 1.1, B before going on to consider the results of the Francophone survey.

Finally, the reader who is interested to know the statistical methods applied to the data collected in the survey of Francophone students is referred to the descriptions of these methods that appear in subsection 1.1, C of the report of results for the Anglophone survey.

## 2.1 Student Diversity

### A. Definition of Groups

In this section of the report, which deals with student diversity on selected background characteristics, on selected characteristics of secondary school programs and on test performance, results are presented separately for five groups of students. Two of the groups are composed of SSHGD-level students and three are composed of SSGD-level students. The groups were formed on the basis of the plans they reported having made for 1976-77. This information was given in response to question 7B of the Questionnaire de l'étudiant.

(a) SSHGD-POSTSEC: This group consisted of students who expected to complete the requirements for a Secondary School Honour Graduation Diploma in June 1976 and to go on to instruction at the postsecondary level in 1976-77 (N = 472).

(b) SSHGD-OTHER: This group of SSHGD-level students had no plans for postsecondary education starting in September 1976. They reported, instead, that they planned to work, return to secondary school, travel, get married, etc. (N = 66).

(c) SSGD-SEC: Students at the SSGD level with plans to return to secondary school in September 1976, presumably to work toward an SSHGD, were included in this group (N = 207).

(d) SSGD-POSTSEC: This group consisted of all students who, in April 1976, were expected to complete requirements for their Secondary School Graduation Diploma the following June and who indicated they were planning to embark on a program of study at the tertiary level in September 1976 (N = 104).

(e) SSGD-OTHER: The majority of students in this SSGD-level group expected to be in full-time employment in September 1976 (N = 200).

Additional information about the students in each group is provided in a series of three tables (see Tables 3.48 to 3.50). (For an explanation of how to interpret the information in tables of results for categorical variables, see subsection 1.2, A in the report of the Anglophone survey.) The figures in Table 3.48 are based on responses to question 9C in the Questionnaire de l'étudiant and are estimates of the percentage of students in each group in the population of Francophone students who had applied to either a university, a College of Applied Arts and Technology, or another type of postsecondary institution. It can be seen, as would be expected, that a large majority of the SSHGD-level students hoped to go to university, whereas a correspondingly large majority of SSGD-level students planned to enter a CAAT. The relatively large percentage (14) of students in the SSGD-POSTSEC group who did not respond to question 9C presumably indicates that, although many students in this group were hoping to go on to postsecondary training, they had not yet applied for admission to a tertiary institution at the time they took the questionnaire.

The destinations of students in the SSGD-OTHER and SSHGD-OTHER groups were ascertained through responses to question 7B of the _Questionnaire de l'étudiant_. A tabulation of these responses led to the results presented in Table 3.49. The most striking feature of these results is the high percentage of students in both groups who planned to leave school to take up full-time jobs. An additional feature that merits comment is the relatively large percentage (13) of SSHGD students who said they would be returning to secondary school in September 1976. Whether they were planning this course of action because they had been incorrectly identified by school principals as being eligible for an SSHGD, or because they were failing one or more courses needed for their SSHGD, or because they simply wanted to pick up an additional course or two in addition to those needed for an SSHGD, or for some other reason, cannot be ascertained from the data that was collected in this study.

Students who indicated they had plans to return to secondary school in September were asked to indicate whether they expected to begin attending a postsecondary educational institution some time before the end of 1979 (see _Questionnaire de l'étudiant_ 8A). As would be expected, the vast majority of students in group SSGD-SEC said "YES" to this question (see the results presented in Table 3.50). In addition, 14 per cent of students in group SSHGD-OTHER also said "YES". This is surprising in view of the fact that only 13 per cent of this group said they would be returning to secondary school in September 1976, and it was only these students who were supposed to answer question 8A. Obviously, some students failed to follow the instructions in the _Questionnaire de l'étudiant_. Despite this, it seems likely that most of the SSHGD-OTHER students who were planning to return to secondary school were also planning eventually to carry on their studies at the postsecondary level.

The information that was obtained on these five groups of Francophone students is presented in the next three portions of this subsection; B is on student background characteristics, C on characteristics of the students' secondary school programs, and D

on the results of the achievement tests. Tables are used to present the findings; they are supplemented, where appropriate and additionally informative, by graphs. There is one table and, when supplementary graphs are provided, one graph per characteristic (variable) that was studied. Each table and graph contains a line of results for each different group for which the information was available.

B. Background Characteristics

The extent of diversity within and among the five groups of Francophone students on a variety of background characteristics is indicated in the numbers contained in Tables 3.51 to 3.60. (Readers who encounter difficulty interpreting the numbers contained in these tables are referred to subsections 1.2, A and 1.2, B in the report of results for Anglophone students, where the meaning of similar numbers is discussed.) Attention is directed to the following features of the tabled results:

(a) There was a majority of females in all groups except SSGD-OTHER, in which the preponderance of males is very large (Table 3.51). It seems that the male Francophone student is more likely to leave school at the SSGD level for the purpose of going to work than is his female classmate.

(b) As would be expected, the SSHGD-level students were older than the SSGD-level students. The SSGD-SEC group was approximately a year younger than either of the SSHGD groups, but the SSGD-POSTSEC and SSGD-OTHER groups were less than a year younger than the SSHGD students (Table 3.52).

(c) Approximately five-sixths of the students, regardless of group membership, reported hearing French spoken in their homes, but only from two-thirds to three-fourths

of the students said they spoke French when outside their schools and homes (Table 3.53).

(d) A higher percentage of students in group SSGD-OTHER than in the rest of the groups had received their education in a language of instruction other than French for one or more years, and this group had the highest percentage of students reporting four or more years of education in a language other than French (Table 3.54).

(e) The vast majority of students in all groups were born in Canada (Table 3.55).

(f) All students not born in Canada appear to have arrived in Canada prior to 1972, and most of these individuals came into the country before 1967 (Table 3.56).

(g) Both parents for the vast majority of students were born in Canada (Table 3.57).

(h) The parents of SSHGD-level students and of SSGD students who were continuing in secondary school (SSGD-SEC) tended to have more formal education than the parents of SSGD students who were leaving school either to go into postsecondary training or to take up work, etc. (Table 3.58).

(i) The fathers/male guardians of students in Group SSGD-OTHER tended to occupy lower status jobs than the fathers/male guardians of students in the other groups (Table 3.59).

(j) The unavailability of postsecondary programs in French had affected the planning that students had done for the future. Sizeable percentages of SSHGD-POSTSEC, SSGD-POSTSEC and SSGD-SEC students apparently were forced by the unavailability of French programs to plan

on taking the program they wanted in English or else on taking a less desired program in French. Sizeable fractions of the SSHGD-OTHER and SSGD-OTHER groups who said they did not plan to take postsecondary training also said they would take training in French if it were available (Table 3.60).

The Questionnaire de l'étudiant contained questions for students leaving school to take up full-time work about their employment plans and questions for all students about their career plans. These questions were answered by too few students to provide results of any value.

## C. Program Characteristics

As was done for the survey of Anglophone students, information was obtained from each participating Francophone school on the programs of courses taken by all the SSGD students who had been included in the sample, regardless of whether or not they had written the tests, and on the programs of courses taken by at most 50 of the SSHGD students who were tested, and at most 30 of the students at this level who had been assigned to tests but who stayed away from school on testing day. The tabulations that were made of this information are presented in Tables 3.61 to 3.64. The first two of these tables concern the SSHGD-level students, the second two concern the SSGD-level students. Notice that, compared with the results just presented on background characteristics, these tables contain results for an extra group--those students who had been assigned to tests but were absent from school on the day the tests were administered. These individuals could not be assigned to one of the other groups for each level of student because they did not complete a Questionnaire de l'étudiant; hence, their plans for September 1976 were not known. Results on these absentees are useful because they enable us to compare the missing students in the sample with those who were present.

The information presented in Tables 3.61 to 3.64 is different from that presented in the tables on background characteristics. As an aid to understanding, the reader is referred to a brief discussion of how to interpret the information in these tables contained in subsection 1.2, C, where program characteristics of Anglophone students are reported. In that same section, descriptions can be found of the different types of credits and courses referred to in Tables 3.61 to 3.64.

From the information on credits obtained for SSHGD-level students (see Table 3.61), support can be obtained for the following conclusions:

(a) From the fact that the percentage of students in the SSHGD group who said they were going on to postsecondary education was higher for each number of total, advanced, mathematics, and traditional academic credits than it was for the SSHGD group with other plans (e.g. return to secondary school, work, marriage, travel), it is apparent that the typical student in the SSHGD-POSTSEC group, as compared with the typical student in the SSHGD-OTHER group, had (from one to two) more credits in total, (from three to four) more credits in advanced level courses, (on the order of one) more credit in mathematics, and (from two to three) more credits in traditional academic courses.

(b) The pattern of results for the students who were truant on testing day (Group SSHGD-ABSENTEES) is not very much like the pattern of results for either of Groups SSHGD-POSTSEC or SSHGD-OTHER. In general, the percentages for the absentees were found to lie somewhere between those for the other groups. (An important exception to this generalization occurred for credits in français courses; see point (c) below.)

(c) The vast majority of SSHGD-level Francophone students had earned at least four credits in the study of français, and approximately 60 per cent had earned at least five. Those who had five credits were taking courses in français at the rate of one per year during their high school careers. Note that, as a group, a smaller percentage of the absentees than of the other groups had studied at least four and at least five français courses.

(d) Over 50 per cent of SSHGD-POSTSEC students, but slightly less than 50 per cent of the other two groups, had earned five or more credits in mathematics. The probability was approximately 0.5 that a Francophone student at the SSHGD-level had taken at least one mathematics course in each year of secondary school.

(e) A majority of the total credits earned by SSHGD-level students were in courses in traditional academic subjects, and at the advanced level of difficulty. In Group SSHGD-POSTSEC, the median number of advanced credits was approximately 24 and the median number of credits in traditional subjects was approximately 25. From this, it follows that the typical student who graduated with an SSHGD in 1976 and had plans for postsecondary study had prepared himself for that study by taking five courses in traditional academic subjects at the advanced level of difficulty each year he was in secondary school.

(f) The relatively large percentage of students having less than the normally required 33 credits for an SSHGD merits some comment. The percentages of students in each of Groups SSHGD-POSTSEC, SSHGD-OTHER and SSHGD-ABSENTEES who had earned fewer than 33 credits by the end of June 1976 were 13, 35 and 28 respectively. It is possible that most of these

students actually failed to qualify for an SSHGD in 1976 because they failed one or more Grade Thirteen courses. Unfortunately, the designation SSHGD in this study refers to the principal's expectation for the student in April of 1976, not to the post-examination reality of June. The likelihood that this kind of April-misclassification was the cause of the aforementioned percentages is heightened by the fact that fully 13 per cent of the SSHGD-OTHER students reported plans to return to secondary school in September 1976; for most the reason for returning seems likely to have been to earn the SSHGD that lay beyond them in June 1976.

The information presented on the Grade Thirteen <u>courses</u> taken by SSHGD-level students during 1975-76 (see Table 3.62) suggests the following conclusions:

(a) The difference between Groups SSHGD-POSTSEC and SSHGD-OTHER lies in the marked tendency for students in the former group to have taken more Grade Thirteen courses in total than students in the latter group. Also there is a less pronounced but nevertheless apparent tendency for students in Group SSHGD-POSTSEC to have taken more Grade Thirteen courses in mathematics/science than students in Group SSHGD-OTHER.

(b) Of Francophone SSHGD students with plans for postsecondary study, almost 80 per cent were taking six or more Grade Thirteen courses in 1975-76, one of which was almost certain to be a language and another of which was a mathematics/science course with probability approximately equal to 0.75. In addition, there was about a two-thirds probability that a student in this group would have taken a second language, and chances were about even that he/she would have taken a

history/geography and a second mathematics/science course.

(c) The students who were absent from school the day of the tests had, as a group, very much the same total number of Grade Thirteen courses as the SSHGD-OTHER group and very much the same number of history/geography/ social science courses as both the other SSHGD groups. This group was different from the others, principally in the lower percentage of students studying the different numbers of Grade Thirteen français courses.

The picture that is described by the credit and course information on SSGD-level students is more complicated than that for SSHGD-level students. In large measure, this is due to the fact that there are four student groups to contend with, not three. The following conclusions seem to hold on the basis of the results presented in Tables 3.63 and 3.64:

(a) Of the three groups SSGD-SEC, SSGD-POSTSEC, and SSGD-OTHER, a higher percentage of the first group, consisting of students who were planning to continue their secondary school studies in September 1976, than of students in the other two groups had accumulated each tabled number of credits in advanced level courses. In most other respects, this group was indistinguishable from Group SSGD-POSTSEC and both had higher percentages for each tabled number of total credits, credits in mathematics courses, and credits in traditional academic subjects than either Group SSGD-OTHER or Group SSGD-ABSENTEES. The other striking difference between the students in either of the groups SSGD-POSTSEC or SSGD-SEC and the students in the other two groups is that a much higher percentage of students in the former two groups than in the latter two were taking at least one and at least

two Grade Twelve level courses in mathematics/science during 1975-76.

(b) The relationship between the tabled percentages for the group of absentees and those for the other groups varies, which is to say that for some number of credits (courses) of a given type, the percentage for the absentees most nearly corresponds with the percentage for SSGD-OTHER, whereas for another number of credits (courses) of the same type, it most nearly corresponds with the percentages for SSGD-SEC and SSGD-POSTSEC. This would seem to indicate that the absentees were students of all three types: those headed for postsecondary study, those headed for continued study in secondary school, and those with other plans. This interpretation of the results for this group conforms reasonably well with what one would expect had a more or less random assortment of SSGD students chosen to be absent from the testing.

(c) Most students, regardless of group membership, had accumulated 27 credits or more by June 1976, thus meeting one of the requirements of the SSGD. The relatively small percentages of students in Groups SSGD-SEC, SSGD-POSTSEC, and SSGD-OTHER, who failed to achieve this number (11, 8, and 11 per cent respectively) may have been incorrectly designated by principals as being eligible for the SSGD, or they may have failed a course or two that, if passed, would have completed their qualification for the SSGD, or they may have been transfer students with incomplete records. The percentage of absentees who had not accumulated 27 credits by the end of June was somewhat higher, at 20, than the percentages for the other groups.

(d) From the tabled percentages of students who had accumulated three or more, four or more and five or more credits in français and in mathematics, it is clear that a large majority of the 1976 Francophone population of SSGD students--well over 80 per cent--took one français credit per year during their secondary school careers, and that a somewhat smaller percentage--on the order of 70 per cent in groups SSGD-SEC and SSGD-POSTSEC, and on the order of 50 per cent in groups SSGD-OTHER and SSGD-ABSENTEES--accumulated one mathematics credit per year.

(e) During 1975-76, between 63 and 81 per cent of students, depending on the group in the Francophone SSGD population, took at least two language courses at the Grade Twelve level. This presumably reflects the fact that both français and English (anglais) are studied by the large majority of Francophone students through to the end of Grade Twelve.

(f) Another striking result is the fact that fewer than one-third of all Francophone SSGD-level students took a Grade Twelve course in history/geography/social science during 1975-76.

(g) It is apparent from the fact that fewer than half the students in Group SSGD-OTHER had 10 or more credits in advanced level courses whereas 64 per cent of Group SSGD-POSTSEC and 85 per cent of SSGD-SEC had 10 or more credits of this type that the students in SSGD-OTHER were less academically inclined than the students in the other two groups.

The foregoing results on credits and courses serve two functions. They better describe the groups of students within each of the SSGD and the SSHGD populations for which information of other kinds has already been presented. They also describe

something of the nature of the courses that were taken by 1976 students thought to be eligible at the time they were sampled, for either an SSGD or an SSHGD. At this point we are ready to compare these groups of students in terms of their scores on the achievement tests.

D. Achievement Tests

Statistical information about the performance of Francophone students on the achievement tests is provided in Tables 3.65 to 3.75. A different perspective in some of the test results is provided by Figures 3.7 to 3.12. A description of the information contained in these figures and a statement concerning their interpretation can be found in subsection 1.2, D of this chapter, where achievement test results are reported for Anglophone students. (Further information of a technical nature about the tests, information that will help the reader interpret the test results, is provided in Appendices A2, A4, A5, A8, A9, B and D.)

A study of Tables 3.65 to 3.75 and Figures 3.7 to 3.12 of test results for Francophone students suggests the following conclusions:

(a) The order of achievement among the five groups on the _Test de compréhension en lecture et de connaissance de la langue (français)_ and the _Test de composition écrite_ is, with minor exceptions, as follows (decreasing order): SSHGD-POSTSEC, SSGD-SEC, SSHGD-OTHER, SSGD-POSTSEC, SSGD-OTHER. The difference between the SSGD students planning to go on to Grade Thirteen (SSGD-SEC) and those going from Grade Thirteen into postsecondary study may be regarded in some sense as the incremental value of Grade Thirteen to performance of this test. (Unfortunately, we have no way to compare the increment due to Grade Thirteen with that

due to a year in university, a CAAT, or some other form of training.)

(b) The SSGD-SEC group is also superior in its performance on the Test d'arithmétique et d'algèbre de base to the other two SSGD groups, with one exception: the performance of the highest scoring students in the group going on to postsecondary study (SSGD-POSTSEC) is on a par with that of the highest scoring students in group SSGD-SEC.

(c) No consistent pattern of results emerges for the Test de connaissance de la langue (anglais). Of course group SSHGD-POSTSEC generally outperformed the other groups and group SSGD-OTHER scored relatively low in comparison with the other groups. But the numerous cross-overs in the results make it impossible to establish an order of merit among the groups SSHGD-OTHER, SSGD-SEC and SSGD-POSTSEC that holds for all three of the subtest scores.

(d) No comparisons are possible between groups SSHGD-POSTSEC and SSHGD-OTHER in performance on the Test de rendement en mathématiques and the Test de rendement en physique because too few students in the latter group wrote these tests to permit the estimation of percentiles.

Some readers may want to compare the performance of Francophone students with the performance of Anglophone students. They are to be forewarned that any comparison based on language test performance would be nonsensical either because different tests were used or, in the case of the Test de composition écrite, which was a translation of the Writing Test, because there is no logical way to put the French and English essays on the same scale, given that they were written in two different languages and scored by two different sets of markers, each set expert in only one language. It might seem, however, that

comparisons between Francophones and Anglophones would be possible for the _Test d'arithmétique et d'algèbre de base_ the _Test de rendement en mathématiques_ and the _Test de rendement en physique_ because these instruments were direct translations of the English language versions. Here again the reader must be forewarned that comparisons are hazardous. It is impossible to say, on the basis of available evidence, whether both versions of the same test were equal in difficulty and it may be impossible to collect the kind of data that would provide a convincing conclusion on the issue of equality of difficulty.

## 2.2 Variation in Marking Standards

The study of variation in marking standards across the Francophone schools in the survey was conducted in the same way that the study of variation in standards over Anglophone schools was done. A description of the procedure and a discussion of its underlying rationale is to be found earlier in this chapter (in subsection 1.3, A) in the presentation of results for the Anglophone study.

### A. Pooled Within-School Correlations

Coefficients of correlation between marks and test scores are reported in Table 3.26. These are based on pooled within-school variances and covariances, statistics which would be unaffected by variation in marking standards among the schools. It will be noted that all correlations, save one, were positive and substantial. The one coefficient that was low is for marks in the general (applications) mathematics course at the SSGD level. Inspection of additional information on the analyses by which the correlation coefficients reported in Table 3.76 were produced--see Table G.3 of Appendix G--revealed that the variance of test scores for the group of students for whom applications course marks were available was only three-tenths the variance of test scores for the group for whom marks in the advanced SSGD (foundations) course were available. The low

variance of test scores for the applications group must be responsible, in large part, for the low coefficient of correlation between the applications course marks and the scores on the *Test d'arithmétique et d'algèbre de base*. Although mean test scores were not obtained in the analyses reported in Table G.3, it is nonetheless true that the mean test score for the applications group was much lower than the mean for the foundations group. It seems that a "floor effect" was responsible for the low variance of test scores; the test was simply too difficult to discriminate well among the members of this group.

Given that the study of marking standards employed test scores as the basis for comparing marks, it seemed unadvisable, in view of the negligible coefficient of correlation between the relevant test and marks in the general mathematics course at the SSGD level, to pursue the analysis any further for this course. In what follows, attention is focussed on only those courses for which the mark-test score coefficients of correlation were substantial.

B. Correlational Evidence Concerning Marking Standards

The regression procedure described in the section on Anglophone results was implemented to obtain a predicted, as well as an observed, mean mark for each school-course combination. These means were based on the results--marks and test scores--for those students within each school for whom we had obtained marks and who had taken the appropriate test. Summary statistics pertaining to the regression analyses that were done are reported in Appendix G, Tables G.1 to G.3.

Coefficients of correlation between observed mean marks and predicted mean marks are reported in Table 3.77. It will be noted that two coefficients are reported for each course, one computed from the means of all the schools for which there were data, and the other computed from the means of only those schools for which data were available on four or more students. The

latter coefficients, based on "trimmed" data, were larger than the untrimmed coefficients in the case of the three SSGD-level courses for which the "trimming rule" resulted in the exclusion of data from either two or five schools; the trimmed coefficient was considerably smaller for the one SSHGD-level course where trimming resulted in the exclusion of data on four schools. In itself this result is very revealing, for it points to the fact that any findings that emerge from the study of marking standards in Francophone schools are relatively unstable, due to the small number of schools involved. The exclusion of only one or two schools from an analysis, for whatever reason, is very likely to affect the results quite substantially. For this reason the results reported here must be interpreted cautiously.

The correlation coefficients reported in Table 3.77 tend to be non-zero and positive. The general implication of these results is that in schools where students did poorly on the achievement tests, teachers tended to award marks that were correspondingly low, and that in schools where students did well on the achievement tests, teachers tended to award marks that were correspondingly high. The tendency cannot be described as strong, and as noted earlier, whatever tendency there is, is very sensitive to the inclusion or exclusion of even as few as two schools.

Coefficients of correlation were also computed between predicted mean marks and the difference between observed and predicted mean marks. These coefficients are reported in Table 3.78 for both the untrimmed and the trimmed samples of schools. With the exception of one coefficient which is near zero, these coefficients are negative. In some cases, the correlation is quite substantial although it must be remembered that these coefficients are very unstable, based as they are on such a small number of schools. The implication of a negative correlation coefficient is that the marks assigned in schools where students did badly on the test were not as low, on the average, as was predicted by the test, whereas the marks assigned in schools

where students did well on the test were not as high, on the average, as was predicted by the test.

The foregoing correlational results seem, on reflection, to be about what one would expect. In general teachers are sensitive to the achievement levels of their students and assign marks accordingly; hence the positive correlation between observed and predicted mean marks. On the other hand, it is probably an unwritten (perhaps even unspoken) rule in education that not every student in a course can fail, no matter how poorly all the students in the course perform; similarly, no matter how well all the students in a course achieve, every one of them cannot be awarded a top mark. Application of this rule would have the effect of reducing the average mark awarded in schools where student achievement was high to a level below that which would be expected from test results, and of increasing the marks given out in schools where student achievement was low to a level above that which would be predicted from test results.

The final step in our correlational study of differences between observed and predicted mean marks was to intercorrelate the differences for different courses. This procedure was implemented in an attempt to assess the degree to which differences between observed and predicted scores varied from course to course within each single school. The results of this part of the study are reported in Table 3.79 and 3.80. The numbers in these tables are difficult to interpret because there is a lack of consistency in the sign, as well as the magnitude, of the coefficients. Moreover, the coefficients based on the untrimmed sample of schools tend to vary, sometimes quite markedly, from the coefficients based on the trimmed sample of schools. On the basis of these results, it is just not possible to say whether Francophone schools having a relatively large (small) difference between observed and predicted means for one course will also have relatively large (small) differences for other courses. The required consistency of results on which to base a conclusion is just not present in these coefficients.

C. Extent of Variation in Difference between Observed and Predicted Mean Marks

To provide some sense of the variation that was found over schools in the magnitude of differences, a distribution of differences was formed for each course. Then, the 25$^{th}$, 50$^{th}$ and 75$^{th}$ percentiles of each distribution were determined; they are reported in Table 3.81. It can be seen that the median deviation (the difference between observed and predicted mean mark) is relatively small in most cases. (The median difference for SSGD general level anglais constitutes an exception.) This means that on the average, over all the schools in the study, the marks that were assigned were close to what would be expected. This should not be surprising; the regression method used to obtain predicted mean marks ensured that the median difference between the predicted and observed mean marks would be relatively small; in fact, the mean difference would be exactly zero.

Greater interest extends to the 25$^{th}$ and 75$^{th}$ percentiles of the distribution of differences. They constitute typical negative and positive deviations; they indicate the magnitude of the decrement or increment a student could expect to receive in his mark just because he attended a school that assigned higher or lower marks than would be predicted from test results. It can be seen from the figures presented in Table 3.81 that the typical decrements and increments represented by the 25$^{th}$ and 75$^{th}$ percentiles are not inconsequential. These "typical" differences between observed and predicted mean marks range from approximately 0.2 to 0.7 of a standard deviation of the distribution of marks, depending on the course. (Note that this standard deviation is for the overall distribution of marks, the one that includes the between-school variance in differences between observed and predicted mean marks. These figures were taken from Tables G.4 and G.6 of Appendix G.) The figures 0.2 and 0.7 of a standard deviation should be compared with the full range of a distribution of marks, which is typically six standard deviations. This suggests the conclusion that a student could do

more to raise his marks by increasing his effort than by changing schools.

Another view of the effect that a difference as large as 0.7 of a standard deviation can have on a student's expected provincial standing in a course can be obtained by considering the following example: Imagine that a student is judged, by the test score he obtained, to be average. This implies that he should be awarded an average mark for the related course. (To see what the mean marks for the various courses were for those students in the survey, consult Tables G.4 and G.6 of Appendix G; however, these marks are not required in the present discussion.) This also implies, provided the provincial distribution of marks for a course is approximately symmetrical, that the student should stand at the 50$^{th}$ percentile of the distribution. Suppose, however, that he were to attend a school where the marking standard was so high that he could expect to be penalized 0.7 of a standard deviation of the mark distribution. This would mean, all other things being equal and assuming that the provincial distribution of marks was approximately normal, that the student's expected percentile rank in the distribution would be 25, not 50 as it should have been. On the other hand, if he were to attend a school where the marking standard was so low that he could expect to be rewarded by 0.7 of a standard deviation of the mark distribution, then instead of standing at the 50$^{th}$ percentile, he could expect to stand at 75$^{th}$ percentile of the mark distribution. The magnitude of the shift in percentile rank in this example is extreme in the sense that it involves the largest difference due to variation in marking standards that is to be found in Table 3.81. If the penalty or reward were only 0.2 of a standard deviation of the mark distribution--this was the smallest "typical" difference reported in Table 3.81--then the shift in percentile rank for the average student would be from 50 to either 42 or 58. (It should be noted that the shifts in percentile rank in the foregoing examples are the largest that are possible for an effect due to variation in marking standards of a given size, as measured in terms of the standard deviation of the mark distribution. The initial

assumption that the student was of average ability is responsible for this. Had it been assumed that the student was either above or below average, as judged from his test performance, then the shift in percentile rank associated with a given effect due to variation in marking standards would have been smaller.)

## D. Conclusions about Variation in Standards

Having reached the end of our study of marking standards in Francophone schools, what can we say? We have found that the predicted mean mark for a school tended to correlate positively with the observed mean mark, although this correlation was weaker than the pooled within-school coefficients of correlation between individual student marks and predicted student marks. We also discovered that the difference between the observed and predicted mean mark for a school was negatively correlated with the predicted mean mark for the school. Finally we demonstrated that "typical" postive and negative differences between observed and predicted mean marks were substantial enough to affect a student's standing in the overall mark distribution of the province. None of this proves that the differences we have studied are wholly or even substantially due to variation in marking standards, although the hypothesis that such variation is a contributing, causal factor certainly must be entertained seriously. (The reader should refer at this point to subsection 1.3, A of this chapter, which contains a discussion of the "circumstances" under which the differences between observed and predicted mean marks can be considered to be due to marking standard differences.) What the results do show is that schools vary in the marks they assign, for whatever reason, and that this variation is sizeable enough to shift a student's location in the distribution of marks quite substantially. What we have <u>not</u> been able to show for these schools is that the variation that exists for marks in one course is consistently and positively correlated with the variation that exists in marks for another course. This result may be due simply to the small size of the sample of schools. But whatever its cause, this null finding suggests that there may be no cause for

concern that variation in marking standards across Francophone schools is conferring an unfair advantage on students from some schools in the competition to win places in postsecondary institutions.

## E. Secondary Results

As a by-product of the analyses done to assess variation in marking standards, there emerged the following results (supporting statistics are to be found in Tables G.1 to G.3 of Appendix G):

(a) Among the Test de composition écrite and the three subtests of the Test de compréhension en lecture et de connaissance de la langue (français), the tests found to be significant predictors of marks in français courses varied with level of course. For marks in the SSHGD-level course, the reading comprehension part of the multiple-choice test and the Test de composition écrite were the only significant predictors. The marks in the SSGD advanced-level course were predicted by the grammar (first language achievement) part of the multiple-choice test and the Test de composition écrite. The two significant predictors of general level SSGD course marks were the reading comprehension and grammar parts of the Test de compréhension en lecture et de connaissance de la langue (français). The third subtest of this latter instrument, the part of the test that assessed knowledge of vocabulary, was not a significant predictor of français marks in courses at any level, although it contributed most as a predictor in the course at the lowest level, the one designated SSGD general. These results presumably indicate something about the kind of knowledge or skills required to do well in the français courses at the different levels.

(b) Two variables contributed significantly to the prediction of marks in Anglais courses, regardless of the level of the course. These were reading comprehension, as measured by an objective test, and writing ability, as assessed by score on the commentary part of the writing exercise. Both these variables

were provided by the Test de connaissance de la langue (anglais). A third score from the test, that for the summary part of the writing exercise, contributed significantly to the prediction of marks in SSHGD-level courses, but not to the prediction of marks in courses at any other level. Markers were unable to score the summary part of the writing exercise very reliably (see Appendix A4), a fact that accounts at least in part, for the limited value of the summary scores.

The foregoing results were based on regression analyses involving pooled within-school variances and covariances. Readers interested in correlational results in which the variation among school means on the variables has not been removed are referred to Tables G.4 through G.7 of Appendix G. These tables contain means, standard deviations, zero-order intercorrelation coefficients and sample sizes for all the tests and school marks obtained on SSHGD students (Tables G.4 and G.5) and SSGD students (Tables G.6 and G.7) in Francophone schools. Aside from having their existence noted, these results are not the subject of further discussion in this report.

At this point the parallel between the Anglophone and Francophone surveys ends. In the Anglophone survey we proceeded from this point to undertake a study of factors related to school achievement. In the Francophone survey we did not undertake such a study because the number of schools involved was too small to offer any hope of achieving statistically stable and interesting results.

## PART B

## THE UNIVERSITY RECORDS SURVEY

### 3. THE SURVEY

The purpose of this survey was twofold: to provide information on the nature of students who entered eleven Ontario universities directly from Grade Thirteen; and to assess the extent to which a student's first year university performance could be predicted from his or her secondary school marks, taking into account information about (i) the university that the student entered, (ii) the program of study that he/she undertook within that university, and (iii) the secondary school from which he/she came to university.

#### 3.1 The Nature of Entrants

A sample of 1490 students was drawn from the Ontario Universities Application Center file of Grade Thirteen students who had applied for admission in September of 1976 to one of 11 Ontario universities, and who had been accepted. The 11 universities were Brock, Carleton, Guelph, Lakehead, Laurentian, McMaster, Ottawa, Toronto, Trent, Waterloo and Windsor. These universities were chosen because they had been included in the study of programs at the Interface (Project III). The sample of students was chosen using a relatively complex stratified sampling scheme which was described in some detail in Chapter Two, Part B. For present purposes, the sample can be described as representative of the 1974-75 population of Grade Thirteen students who made application to one of the 11 universities and were accepted. The sample is <u>not</u> representative of the total 1974-75 population of Grade Thirteen students; it is <u>not</u>

representative of the students who made application to all the Ontario universities and were accepted for study, beginning in September 1975; it is not even representative of all the students who made application to the 11 universities and were accepted for study, beginning in September 1975.

The purpose of this section of the report of results on the University Survey is to describe the sample in some detail. This has been done through a series of tables, one table for each characteristic employed in the description of the students.

In most of the tabulations that are presented, the sample of 1490 has been divided into two groups. The first group consists of all students for whom acceptable data were available. A student was judged to have acceptable data if four or more of the marks that he/she had earned in SSHGD courses were on the file of the Ontario Universities Application Center and if he/she had earned a mark in at least one university course during 1975-76. There are 1290 students in this group.

The second group consists of students with unacceptable data. One hundred and eighty-four students fell into this second class because the universities into which they had been accepted could not provide a transcript of marks for them. Transcripts were unavailable for a variety of reasons: some students had failed to register, others had dropped out of university during the year, and in one institution several students refused the university permission to send us their transcripts. Also included in this second group were 21 students for whom there were three or fewer SSHGD course marks on file. (This does not mean that these students had taken less than four SSHGD courses, only that fewer than four marks were on file for them. For example, marks obtained in SSHGD courses taken prior to 1974-75 would not be on the Ontario Universities Application Center file for students who applied for admission to university from Grade Thirteen in September 1975.)

It would appear from the foregoing description of the group for which the data were unacceptable that the size of the group was 205. In fact, the sets of 184 and 21 students overlapped by five, so that altogether there were only 200 in the group.

One further division has been made in some of the tables in this section of the report. The data on those students for whom there was acceptable data was used to make two tabulations: one by university, the other by university program. The first tabulation is obvious; it was used to provide, for example, information about the percentages of males and females in the group who attended each university. The second tabulation was made by sorting all the students, regardless of university attended, into one of four program categories: Humanities/Arts, Social Sciences, Sciences, and Professions. Each student's program category was determined on the basis of the number of courses that he/she took in each program area during first year. A description of the method that was used to assign students to program categories can be found in Chapter Two, Part B. The number of students assigned to each program area in each university is given in Table 3.82. (Sixteen of the 21 students for whom marks were available on fewer than four SSHGD courses were inadvertently included in this tabulation.)

## A. Sex, Age, Country of Birth and Mother Tongue

Tabulations for each of these characteristics are to be found in Tables 3.83 to 3.86. There was little variation in the mean age of the entrants to the universities from the student population under study, and what variation there was, was not statistically significant. When the universities were compared in terms of the percentage of male (female) entrants from the population under study, the percentage of Canadian-born entrants, and the percentage of entrants whose mother tongue was given as English, French or some other language, the variation among universities was relatively large, and statistically significant. We found, for example, that females were preponderant in the groups

entering Guelph, Ottawa and Trent, and that while the percentage of male entrants over all universities exceeded the percentage of females (54 to 46), the preponderance of males entering Waterloo was much larger (68 to 32). The percentage of Canadian-born entrants, 86 over all, was higher at Trent, Guelph and Laurentian, lowest at Toronto and Windsor. As would be expected, the highest percentages of entrants speaking French as mother tongue were for Ottawa and Laurentian. Toronto had the largest percentage of entrants who gave a language different from either English or French as mother tongue.

The differences among programs on all four characteristics were statistically significant. Students in the Humanities/Arts program area were predominantly female; they were younger on the average than the students in the other program areas; and as a group, contained the smallest percentage of native speakers of English, the largest percentage of native speakers of French. The Social Sciences group was marked by the fact that, on the average, it was the oldest of the four groups, and contained the highest percentages of Canadian-born students and native speakers of English. The Sciences and Professions groups were composed predominantly of males. The Sciences group was additionally marked by the fact that it contained the lowest percentage of Canadian-born students.

## B. SSHGD Credits and Marks

Information on the number of SSHGD credits earned by each student in each of three program areas, and in total, and the mark averages earned by the students in the SSHGD courses that they took in each program area, and in total, is provided in the series of tables numbered 3.87 to 3.94. The program areas that were identified were languages; social sciences, including history, geography, economics, etc.; and mathematics/sciences. This categorization was done using the course titles coded in the Ontario Universities Application Center file. Each course title was categorized by following as closely as possible the

classification that had been used to assign university courses to program areas (see Appendix C).

Tables 3.87 to 3.94 merit little comment. The differences among universities are relatively large, and in all cases statistically significant. The same is true of the interprogram differences. Most of the program differences, if not all, are much as would be expected. For example, it is certainly not surprising to find that Humanities/Arts students earned more credits in SSHGD language courses on the average than Sciences students and, again on the average, earned rather better marks in these courses. Most of the differences among universities seem equally unsurprising given the public reputations of these institutions and the program areas that students concentrated on during their first year of university.

## C. University Courses

Information was available from university transcripts on the number of courses each student completed during his/her first year in each program area--Humanities/Arts, Social Sciences, Sciences, and Professions. This information was tabulated separately for courses in each program area, once for all the surveyed entrants to each university, and once for all the entrants to each program area. The tabulations by university appear in Tables H.1 to H.4 of Appendix H. The variation among universities on the number of courses students completed in each program area was statistically significant for each program area. Detailed study of this information by the interested reader will reveal a number of differences among universities. Unfortunately, these differences were difficult to interpret because the tabulations were made using each course listed in a student's transcript, regardless of the credit value of a course or the number of instructional hours assigned to it. Obviously there was wide variation among universities, and even within the same university, in the numbers of courses students were taking, presumably due, for the most

part, to differences in the credit value of different courses. For this reason, the results have been consigned to an appendix.

The tabulations of first year courses completed in each program area by students in each program area, regardless of university, are presented in Tables H.5 through H.8 of Appendix H. The figures in these tables are also difficult to interpret, because of variation in the credit value of different courses. Moreover, the result that the students in a program area took many more courses in that area than the students in another area--and this is the main difference to be seen in these tables--is unsurprising because students were classified into program areas on the basis of the number of courses taken in the different areas.

### D. University Marks

The average mark in first year university courses was computed for each student. This average was obtained by weighting the mark for a course by the credit value of the course, as indicated on the university transcript. Statistics describing the distribution of average marks for the survey students in each university and each program area are given in Table 3.95. The variation in the means of average marks among universities was statistically significant. The variation in the means for program areas was also statistically significant. These differences presumably reflect differences in marking standards among the universities and among program areas. These differences are of interest in the next section on the prediction of university marks.

## 3.2 Prediction of First Year University Marks

### A. Procedure

The method used in our investigation of the predictability of university marks differed substantially from methods used in

previous investigations conducted in the province (see, for example, Fleming, 1959, 1962; Khan and McBain, 1970; Khan, Ransom and Herbert, 1970; Khan and Rickard, 1971a, 1971b, 1971c). The previous work was conducted by collecting secondary school marks and university marks for students in a particular university and, in some cases, a particular program or course at the university. Correlation coefficients were then calculated for each different group of students that was available. This type of analysis can be criticized in two respects. First, it generates a large number of correlation coefficients; hence it is difficult to summarize the degree of prediction that was attained. Second, although differences among universities and among courses or programs within universities are more or less adequately handled by undertaking separate analyses for each university and course or program within universities, still, this method fails to take into account the secondary school from which the students came. Given the evidence presented earlier in this chapter on variation in marking standards across secondary schools, it could well be important to make allowance for this variation when predicting university achievement.

In the present investigation, a procedure was employed that allowed us to make a single unified analysis. This procedure was multiple-linear regression. In the main analysis, university mark average in first year courses served as the dependent variable (that which was to be predicted). Four types of predictors were used: (i) mark average in SSHGD courses; (ii) university of attendance; (iii) university program; (iv) secondary school of attendance for the SSHGD. The latter three types of predictor each formed a set of predictors. To see how this was done, consider the type of predictor called "university of attendance". There were 11 universities in the survey; thus a set of ten "dummy" variables was formed, using the first ten universities. Each student was assigned a "score" on these dummy variables; his/her score was one on the dummy variable for a university if he/she attended that institution; otherwise his/her "score" on the variable was zero. (It was not possible to form 11 dummy variables, given that there were 11 universities, for

mathematical reasons associated with this type of analysis. These reasons apply to this type of analysis in general, and are not peculiar to the present study. Actually, only 10 dummy variables were formed, and the students attending the eleventh university were assigned a "-1" score on all 10 variables.) In the same way, three dummy variables were formed for university programs, and a number of dummy variables equal to one less than the number of secondary schools from which students in the survey had been selected were also formed. (Because institutions--that is, universities and secondary schools--and programs are not random variables in the same sense as mark average, the "variables" formed for these factors have been referred to as "dummy" variables.)

A series of regression analyses was performed using the four types of predictors listed above. The analyses differed in the number of types of predictors that had been included. The results of the following analyses have been selected for report here: (i) The analysis including only SSHGD mark average as a predictor: This analysis indicates how well first year university mark average can be predicted from secondary school mark average when differences among programs and among institutions, both universities and secondary schools, are ignored. (ii) The analysis including SSHGD mark average and university of attendance as predictors: This analysis indicates how much it is possible to improve the prediction of university mark average by making an adjustment for the degree to which marking standards vary among universities. (iii) The analysis including SSHGD mark average, university of attendance, and university program as predictors: From this analysis we could judge the degree to which prediction can be improved by making an allowance for variation in marking standards among university programs. (iv) Finally, the analysis in which secondary school of attendance was added to the three other types of predictors was selected for inclusion in the report: This analysis indicates the amount that prediction of university mark averages can be enhanced by taking into account the secondary schools where students earned their SSHGD marks.

The summary report of the regression analyses contains several types of information: the amount of variance in university mark averages that is not accounted for by a set of predictors; the coefficient of multiple-correlation between the predictors and the university mark average; the F-ratio to test the significance of the contribution made by a type of predictor to the prediction of university mark average (strictly speaking, the use made here of F rests on the assumption that the effects in the analysis due to universities, programs and secondary schools are random, an assumption that might well be questioned); and the degrees of freedom associated with the F-ratio. In addition, information is reported on the coefficients of regression for each type of variable entered in the final analysis, the one involving all types of variables.

## B. Predictability of First Year Average

The main results of interest are to be found in Table 3.96. It can be seen from these results that prediction of university mark averages is significantly improved by the addition to the prediction equation of each type of predictor. The addition of secondary school attended as a type of predictor to the equation seems, on the face of it, to add substantially to the prediction of university success. (Note the increase in the multiple-correlation coefficient from 0.64 to 0.69.) This increase may be illusory, however, because such a large number of degrees of freedom is associated with this predictor. When we estimated what the multiple-correlation coefficient would be in the population, using the population regression equation as estimated from these sample results, the multiple-correlation coefficient, including secondary school attended as predictor, drops back to 0.64. This is equal to the multiple-correlation achieved without using secondary school attended as a predictor. (All the other correlation coefficients reported in Table 3.96 are themselves equal to the population values that could be expected from use of the population regression equation.)

The correlations reported in Table 3.96 can be compared with those obtained in previous research. Fleming (1959, Table IV.a.1) reported a correlation coefficient for all Ontario universities combined of 0.60 between Grade Thirteen mark average and first year university average. This result is apparently the correlation obtained by ignoring university of attendance, and hence should be compared with the coefficient of 0.59 obtained in the present study for the correlation between Grade Thirteen mark average and first year university mark average. If the separate correlations Fleming reported for each university are averaged, the result is a figure of 0.64. This should be compared with the coefficient of 0.62 obtained in the present study by adding university attended as a set of predictors, along with Grade Thirteen mark average. Fleming does not report correlation coefficients that can be compared with the other two that were obtained in this analysis. The two comparisons that can be made suggest that there has been little change over the twenty years since the Atkinson data were collected in the predictability of first year university marks from the Grade Thirteen mark average, this despite the fact that during those twenty years the Grade Thirteen departmental examinations were discontinued.

The correlations obtained in the present study also compare favourably with those reported by Khan and his collaborators (Khan and McBain, 1970; Khan, Ransom and Herbert, 1970; Khan and Rickard, 1971a, b, c). If, for example, all the correlation coefficients between Grade Thirteen mark average and first year university marks that are reported by Khan and Rickard (1971c) for universities included in the present survey are averaged, the figure of 0.53 is obtained. This figure applies to the post-departmental examination year of 1969-70. Students in first year university that year had graduated from secondary school in June 1969, the second year after the discontinuation of the departmentals. Inasmuch as Khan and Rickard typically reported correlation coefficients for each university program or department or faculty taken separately, the appropriate comparison figure from the present study would seem to be the third, which includes

university attended and program of study at university as predictors. This figure was 0.64.

There is some question of comparability between the correlation coefficients obtained in the present study and those obtained by Fleming and by Khan and Rickard. The question arises over the nature of the samples involved. Fleming's study involved virtually all the Grade Thirteen students of 1955-56 who entered an Ontario university in the fall of 1956, and the study included all the Ontario universities and affiliated colleges then in existence, except for Carleton. The present survey was not nearly so sweeping as that. In the case of the study by Khan and Rickard, the correlations are for all the universities who provided results on first year students, but not all Ontario universities participated in the survey.

Despite possible differences in the nature of the previous Ontario studies that have been cited and the present one, it seems safe to conclude that first year university marks are as predictable in 1976 from the Grade Thirteen average and information about the university attended and the program of study in university as they were back in the recent, and not so recent, past.

## C. Regression Coefficients

Information about the partial regression coefficients for each type of predictor in the final analysis of university average marks is provided in Table 3.97 and 3.98. Standard errors are provided as a basis for judging whether or not a coefficient is sufficiently different from zero--if the coefficient is approximately twice its standard error, the probability is less than one in twenty that it differs from zero by chance.

The regression coefficients in Table 3.99 may be interpreted as follows:

(1) The coefficient for Grade Thirteen mark average indicates the amount that university mark average can be expected to increase for an increase of one mark in Grade Thirteen mark average. This coefficient, like the others, is a <u>partial</u> regression coefficient, so the indicated increase is what we predict holding all the other variables (in this case, university program and high school of origin) constant.

(2) The regression coefficient for university attended is the amount that a student can expect will be added to (subtracted from, in the case of a negative coefficient) his/her predicted mark just because he/she attends a particular institution. Clearly, the first year average a student can expect to earn regardless of his/her Grade Thirteen average is lower if he/she enters the University of Toronto than if he/she goes instead to Trent or Windsor.

(3) The regression coefficients for program in Table 3.97 were the adjustments that had to be added to or subtracted from a student's predicted first year mark average to bring it closely into line with his observed first year mark average. The adjustment was positive for Humanities/Arts and Social Sciences students, negative for Sciences and Professions students.

Regression coefficients for specific secondary schools are not reported. What is given instead is a frequency distribution of the coefficients for secondary schools (Table 3.98). A secondary school coefficient is the amount that would have to be added to (or subtracted from) the first year mark that would be predicted for a student from his Grade Thirteen mark average, the university he/she entered and the program of study he/she undertook in order to allow for the difference between the marking standard of the secondary school he/she attended and the overall Grade Thirteen marking standard of the secondary schools included in the survey. Although the magnitude of the adjustment varied from +6 to -7, approximately, the reader must put this information in perspective--in fact, the results of our analysis suggest that we could not expect to gain a great deal of added

predictability that is reliable by taking the differences in marking standards that exist among secondary schools into account.

To round out the report of the regression analysis involving first year mark average, information is provided on the number of students entering a university in the survey for each different secondary school. This information is in the form of a frequency distribution of the number of students from each of the secondary schools that had been attended by the students in the survey who had acceptable data.

## D. Additional Analyses

Three additional regression analyses were performed. The first analysis involved the first year mark average in Humanities/Arts courses achieved by only those students classified as being in an Humanities/Arts program. The predictors were Grade Thirteen mark average in language courses, and secondary school attended. University attended could not be employed as a predictor in this analysis because the number of students per university was very small in several instances. The results of this analysis are reported in Table 3.100.

The second analysis involved the first year mark averages in science that were achieved by only those students classified as being in a Sciences program. The predictors were Grade Thirteen mark average in mathematics/science courses, and secondary school attended. Again, university attended could not be used as a predictor because of the small number of students in the Sciences program area in several universities. Results from this analysis are presented in Table 3.101.

The third analysis was similar to the second, except that it was restricted to the four universities that had the largest number of students classified as being in a Science program. In this case it was possible to include the university a student attended as a predictor in the analysis. The correlation

coefficients obtained in this analysis are presented in Table 3.102, and the regression coefficients for the Grade Thirteen mark average in mathematics/science courses and for the four universities are given in Table 3.103.

The results of these three analyses indicate that marks in Humanities/Arts courses are not as predictable from the Grade Thirteen mark average in language courses as marks in Sciences courses are from the Grade Thirteen mark average in science/mathematics courses. This may be due, in large measure, to the fact that students in the Humanities/Arts program area had, on the average, only 2.9 credits in SSHGD language courses, whereas students in the Sciences program area had, on the average, 5.1 credits in mathematics/science courses. Obviously, there was a better basis of secondary school marks from which to predict for students in a Sciences program than for students in a Humanities/Arts program.

Another result of interest that emerges from these additional analyses is the fact that secondary school attended <u>did not</u> add significantly to the prediction of the Humanities/Arts course marks of students in the Humanities/Arts program area. This factor <u>did</u>, however, add significantly to the prediction of the science course marks of students in the Sciences program area, but further analysis suggests that the correlation coefficient observed in this sample is much larger than the coefficient that could be expected in the population using the population regression. The contribution to prediction made by the factor of secondary school attended seems of questionable value, both in these additional analyses and in the main analysis involving mark averages in first year university and Grade Thirteen.

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TABLE 3.1

Type of Postsecondary Institution to Which Students Have Applied for Admission (Estimated Percentage of Each Group in the Population)

| Group | | University[a] | CAAT[b] | Other[c] | No Response |
|---|---|---|---|---|---|
| SSHGD-POSTSEC | % | 78 | 14 | 6 | 2 |
| (N=3060; n=52) | S.E. | (1.4) | (1.2) | (0.6) | (-) |
| SSGD-POSTSEC | % | 9 | 66 | 9 | 16 |
| (N=302; n=52) | S.E. | (2.8) | (4.0) | (1.8) | (-) |

Note: This breakdown is based on the first postsecondary institution named in response to question 9c of the *Student Questionnaire*. N is the number of students; n is the number of secondary schools.

[a]This category includes both Ontario universities (excluding Ryerson) and universities outside the province that were named by students.

[b]This category includes all the Ontario Colleges of Applied Arts and Technology that were named.

[c]This category includes any teacher training institution, art college, institute of technology (including Ryerson), institution for religious training, military college, business college, mining school, hospital training program or any other training program that was named, whether located in the Province of Ontario or out of it.

TABLE 3.2

Destinations of Students in the SSHGD-OTHER and SSGD-OTHER Groups (Estimated Percentage of Each Group in the Population)

| Group | | Secondary | Work | Other[a] | No Response |
|---|---|---|---|---|---|
| SSHGD-OTHER | % | 17 | 65 | 16 | 2 |
| (N=696; n=52) | S.E. | (2.6) | (2.8) | (1.9) | (-) |
| SSGD-OTHER | % | - | 90 | 7 | 3 |
| (N=532; n=52) | S.E. | (-) | (2.1) | (1.5) | (-) |

[a]This category includes students who were planning to get married or travel or who had no fixed plans.

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.3

Plans for Future Attendance at a Postsecondary Institution
(Estimated Percentage of Each Group in the Population)

| Group | | Plan to Attend before End of 1979 | Do Not Plan to Attend before End of 1979 | No Response |
|---|---|---|---|---|
| SSHGD-OTHER | % | 13 | 3 | - |
| (N=696[a]; n=52) | S.E. | (1.9) | (1.9) | (-) |
| SSGD-SEC | % | 91 | 8 | 1 |
| (N=960; n=52) | S.E. | (1.0) | (0.9) | (-) |

[a]The number of students out of 696 in the SSHGD-OTHER group who indicated they would be returning to secondary school for 1976-77 was 111, but the percentages are based on the total N for the group.

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.4

Sex Distribution
(Estimated Percentage of Each Group in the Population)

| Group | | Male | Female | No Response |
|---|---|---|---|---|
| SSHGD-POSTSEC (N=3060; n=52) | % | 51 | 48 | - |
| | S.E. | (1.8) | (1.8) | (-) |
| SSHGD-OTHER (N=696; n=52) | % | 56 | 41 | 2 |
| | S.E. | (3.3) | (3.2) | (-) |
| SSGD-SEC (N=960; n=52) | % | 51 | 48 | 1 |
| | S.E. | (1.8) | (1.7) | (-) |
| SSGD-POSTSEC (N=302; n=52) | % | 45 | 54 | 1 |
| | S.E. | (3.3) | (3.3) | (-) |
| SSGD-OTHER (N=532; n=52) | % | 47 | 50 | 3 |
| | S.E. | (3.4) | (3.2) | (-) |

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.5

Age Distribution
(Estimated Percentiles of the
Distribution for Each Group in the Population)

| Group | | Percentile $10^{th}$ | $25^{th}$ | $50^{th}$ | $75^{th}$ | $90^{th}$ | Percentage of Non-Respondants |
|---|---|---|---|---|---|---|---|
| SSHGD-POSTSEC | | 18.0 | 18.5 | 18.8 | 19.2 | 19.5 | 2 |
| (N=3060; n=50) | S.E. | (0.04) | (0.02) | (0.02) | (0.03) | (0.04) | (-) |
| SSHGD-OTHER | | 18.1 | 18.6 | 18.9 | 19.2 | 19.5 | 2 |
| (N=696; n=52) | S.E. | (0.05) | (0.03) | (0.01) | (0.03) | (0.04) | (-) |
| SSGD-SEC | | 17.2 | 17.6 | 17.9 | 18.2 | 18.4 | 2 |
| (N=960; n=52) | S.E. | (0.04) | (0.02) | (0.02) | (0.02) | (0.03) | (-) |
| SSGD-POSTSEC | | 17.5 | 17.7 | 18.1 | 18.4 | 19.0 | 3 |
| (N=302; n=52) | S.E. | (0.05) | (0.05) | (0.04) | (0.05) | (0.10) | (-) |
| SSGD-OTHER | | 17.5 | 17.7 | 18.1 | 18.5 | 19.2 | 5 |
| (N=532; n=52) | S.E. | (0.06) | (0.05) | (0.04) | (0.04) | (0.10) | (-) |

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.6

Language Used
(Estimated Percentage of Each Group in the Population)

| Group | | Language Spoken by Parents/ Guardians in the Home | | | | Language Spoken by Student Outside Home and School | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | English | French | Other | No Response | English | French | Other | No Response |
| SSHGD-POSTSEC | % | 82 | 4 | 14 | - | 95 | 3 | 2 | - |
| (N=3060; n=52) | S.E. | (2.4) | (0.5) | (2.5) | (-) | (0.7) | (0.3) | (0.6) | (-) |
| SSHGD-OTHER | % | 90 | 3 | 7 | 1 | 97 | 2 | - | 1 |
| (N=696; n=52) | S.E. | (2.3) | (0.7) | (2.1) | (-) | (0.8) | (0.7) | (-) | (-) |
| SSGD-SEC | % | 87 | 3 | 11 | - | 97 | 2 | 1 | 1 |
| (N=960; n=52) | S.E. | (1.8) | (0.6) | (1.9) | (-) | (0.7) | (0.5) | (0.3) | (-) |
| SSGD-POSTSEC | % | 85 | 2 | 13 | 1 | 95 | 1 | 3 | 1 |
| (N=302; n=52) | S.E. | (2.8) | (0.6) | (2.7) | (-) | (2.1) | (0.4) | (2.1) | (-) |
| SSGD-OTHER | % | 87 | 2 | 10 | 1 | 97 | 1 | 1 | 1 |
| (N=532; n=52) | S.E. | (2.1) | (0.6) | (2.1) | (-) | (0.8) | (0.5) | (0.4) | (-) |

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.7

Years of Instruction in a Language Other Than English
(Estimated Percentage of Each Group in the Population)

| Group | | Years of Instruction[a] 1-3 | 4-6 | 7 or more | No Response (Presumed 0) |
|---|---|---|---|---|---|
| SSHGD-POSTSEC | % | 3 | 3 | 5 | 88 |
| (N=3060; n=52) | S.E. | (0.5) | (0.6) | (0.9) | (-) |
| SSHGD-OTHER | % | 3 | 2 | 3 | 91 |
| (N-696; n=52) | S.E. | (0.8) | (0.7) | (0.8) | (-) |
| SSGD-SEC | % | 5 | 4 | 4 | 87 |
| (N=960; n=52) | S.E. | (0.8) | (0.7) | (0.5) | (-) |
| SSGD-POSTSEC | % | 6 | 6 | 6 | 81 |
| (N=302; n=52) | S.E. | (1.5) | (1.8) | (2.3) | (-) |
| SSGD-OTHER | % | 11 | 5 | 3 | 82 |
| (N=532; n=52) | S.E. | (2.0) | (1.0) | (1.0) | (-) |

[a]These figures were obtained by combining responses to items 2C and 2E in the <u>Student Questionnaire</u>, the first dealing with years of instruction in French, the second with years of instruction in a language other than English or French. This was done because very few students responded to each item.

Note: N is the number of students, n is the number of secondary schools.

TABLE 3.8

Country of Birth
(Estimated Percentage of Each Group in the Population)

| Group | | Country: Canada | Other[a] | No Response |
|---|---|---|---|---|
| SSHGD-POSTSEC | % | 87 | 13 | - |
| (N=3060; n=52) | S.E. | (1.9) | (1.9) | (-) |
| SSHGD-OTHER | % | 88 | 11 | 1 |
| (N=696; n=52) | S.E. | (2.7) | (2.7) | (-) |
| SSGD-SEC | % | 90 | 10 | - |
| (N=960; n=52) | S.E. | (1.6) | (1.6) | (-) |
| SSGD-POSTSEC | % | 84 | 16 | - |
| (N=302; n=52) | S.E. | (2.9) | (2.9) | (-) |
| SSGD-OTHER | % | 91 | 9 | 1 |
| (N=532; n=52) | S.E. | (1.9) | (1.8) | (-) |

[a]This category constitutes the combination of the response options United States, Great Britain, France and Other. The combination was made because only a small percentage of students were foreign born.

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.9

Year of Student's Entry into Canada if Born Outside the Country (Estimated Percentage of Each Group in the Population)

| Group | | Prior to 1967 | Between 1967 and 1971 | Since 1971 |
|---|---|---|---|---|
| SSHGD-POSTSEC | % | 6 | 3 | 3 |
| (N=414; n=52) | S.E. | (0.8) | (0.8) | (0.9) |
| SSHGD-OTHER | % | 9 | 1 | 2 |
| (N=65; n=52) | S.E. | (3.2) | (0.5) | (0.6) |
| SSGD-SEC | % | 5 | 3 | 2 |
| (N=97; n=52) | S.E. | (1.1) | (0.6) | (0.6) |
| SSGD-POSTSEC | % | 8 | 3 | 4 |
| (N=40; n=52) | S.E. | (2.0) | (1.1) | (2.1) |
| SSGD-OTHER | % | 4 | 2 | 2 |
| (N=37; n=52) | S.E. | (1.0) | (0.8) | (1.2) |

[a]For each group, N is the number of students who reported being born outside Canada and who gave a year of entry into the country. The percentages in the table, however, are of the total group (see the N's reported in the previous table).

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.10

Country of Birth of Parents/Guardians
(Estimated Percentage of Each Group in the Population)

| Group | | Both Canada | One Canada | Neither Canada | No Response |
|---|---|---|---|---|---|
| SSHGD-POSTSEC | % | 63 | 11 | 26 | - |
| (N=3060; n=52) | S.E. | (2.4) | (0.8) | (2.5) | (-) |
| SSHGD-OTHER | % | 64 | 10 | 25 | 2 |
| (N=696; n=52) | S.E. | (3.6) | (1.4) | (3.6) | (-) |
| SSGD-SEC | % | 64 | 10 | 25 | 1 |
| (N=960; n=52) | S.E. | (2.4) | (0.9) | (2.3) | (-) |
| SSGD-POSTSEC | % | 59 | 14 | 25 | 1 |
| (N=302; n=52) | S.E. | (4.0) | (2.4) | (3.4) | (-) |
| SSGD-OTHER | % | 67 | 10 | 22 | 2 |
| (N=532; n=52) | S.E. | (3.2) | (1.3) | (2.8) | (-) |

Note: If a student responded for more than one of natural father (mother), adoptive father (mother) and male (female) guardian, the response for male (female) guardian was used if there was one, otherwise the response for adoptive father (mother) was used.

TABLE 3.11

Education of Parents/Guardians
(Estimated Percentage of Each Group in the Population)

| Group | Parent/ Guardian | | Level Attained[a] 1 | 2 | 3 | 4 | 5 | 6 | 7 | No Response |
|---|---|---|---|---|---|---|---|---|---|---|
| SSHGD-POSTSEC | | % | 5 | 6 | 14 | 22 | 21 | 4 | 28 | - |
| (N=3060; n=52) | Male | S.E. | (0.6) | (1.1) | (1.2) | (1.1) | (1.3) | (0.4) | (1.9) | (-) |
| | | % | 4 | 5 | 12 | 20 | 31 | 3 | 24 | - |
| | Female | S.E. | (0.6) | (0.9) | (1.4) | (1.3) | (1.7) | (0.4) | (1.5) | (-) |
| SSHGD-OTHER | | % | 10 | 5 | 19 | 21 | 17 | 3 | 22 | 1 |
| (N=696; n=52) | Male | S.E. | (2.3) | (1.1) | (2.8) | (1.9) | (2.0) | (0.7) | (2.4) | (-) |
| | | % | 7 | 4 | 11 | 22 | 34 | 2 | 18 | 1 |
| | Female | S.E. | (2.2) | (1.0) | (1.5) | (2.5) | (2.7) | (0.6) | (1.9) | (-) |
| SSGD-SEC | | % | 7 | 4 | 14 | 22 | 23 | 4 | 24 | - |
| (N=960; n=52) | Male | S.E. | (1.1) | (1.0) | (1.7) | (1.5) | (1.3) | (0.7) | (2.2) | (-) |
| | | % | 5 | 4 | 12 | 22 | 32 | 3 | 21 | - |
| | Female | S.E. | (0.8) | (0.9) | (1.4) | (1.6) | (1.7) | (0.6) | (1.6) | (-) |
| SSGD-POSTSEC | | % | 5 | 9 | 24 | 22 | 19 | 4 | 16 | 1 |
| (N=302; n=52) | Male | S.E. | (1.4) | (1.8) | (2.8) | (2.7) | (2.7) | (2.1) | (3.4) | (-) |
| | | % | 6 | 6 | 17 | 25 | 26 | 6 | 13 | 1 |
| | Female | S.E. | (1.6) | (1.5) | (2.4) | (3.2) | (3.4) | (2.4) | (2.7) | (-) |
| SSGD-OTHER | | % | 9 | 11 | 24 | 25 | 16 | 2 | 12 | 1 |
| (N=532; n=52) | Male | S.E. | (1.7) | (1.6) | (2.1) | (2.2) | (1.7) | (0.7) | (2.6) | (-) |
| | | % | 8 | 8 | 21 | 25 | 22 | 2 | 12 | 1 |
| | Female | S.E. | (1.7) | (1.6) | (2.9) | (2.4) | (2.1) | (0.7) | (2.2) | (-) |

Note: If a student responded for more than one of natural father (mother), adoptive father (mother) and male (female) guardian, the response for natural father (mother) was used if there was one, otherwise the response for adoptive father (mother).

Note: N is the number of students; n is the number of secondary schools.

[a]Codes:
1. Unknown.
2. Did not complete elementary school.
3. Completed elementary school, but did not continue to secondary school.
4. Attended secondary school, but did not graduate.
5. Graduated from secondary school, but did not continue to postsecondary educational institution.
6. Attended a postsecondary institution, but did not graduate.
7. Graduated from a postsecondary educational institution.

TABLE 3.12

Level of Occupation of Parents/Guardians
(Estimated Percentage of Each Group in the Population)

| Group | Parent/ Guardian | | Level of Occupation on Blishen Scale[a] 2 | 3 | 4 | 5 | 6 | 7 | Student | Home-maker | No Response |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SSHGD-POSTSEC (N=3060; n=52) | Male | % | 12 | 19 | 23 | 15 | 9 | 15 | - | 2 | 5 |
| | | S.E. | (1.5) | (1.3) | (1.4) | (1.3) | (0.9) | (1.2) | (-) | (0.3) | (-) |
| | Female | % | 6 | 9 | 15 | 5 | 2 | 5 | - | 56 | 3 |
| | | S.E. | (1.0) | (0.8) | (1.1) | (0.60) | (0.3) | (0.5) | (-) | (1.2) | (-) |
| SSHGD-OTHER (N=696; n=52) | Male | % | 16 | 20 | 21 | 13 | 8 | 12 | - | 5 | 6 |
| | | S.E. | (3.0) | (2.8) | (2.3) | (1.8) | (1.4) | (1.5) | (-) | (2.0) | (-) |
| | Female | % | 4 | 10 | 14 | 5 | 3 | 3 | - | 56 | 4 |
| | | S.E. | (1.5) | (1.4) | (1.6) | (1.3) | (0.6) | (0.8) | (-) | (3.0) | (-) |
| SSGD-SEC (N=960; n=52) | Male | % | 12 | 23 | 23 | 14 | 10 | 11 | - | 4 | 3 |
| | | S.E. | (1.8) | (2.2) | (1.8) | (1.4) | (1.4) | (1.3) | (-) | (0.6) | (-) |
| | Female | % | 6 | 9 | 18 | 5 | 3 | 4 | 1 | 52 | 3 |
| | | S.E. | (1.0) | (1.1) | (1.4) | (1.0) | (0.6) | (0.6) | (0.3) | (1.9) | (-) |
| SSGD-POSTSEC (N=302; n=52) | Male | % | 16 | 25 | 22 | 12 | 7 | 9 | - | 4 | 6 |
| | | S.E. | (2.3) | (2.6) | (3.5) | (2.3) | (2.4) | (2.5) | (-) | (1.4) | (-) |
| | Female | % | 4 | 12 | 17 | 3 | 2 | 5 | - | 54 | 3 |
| | | S.E. | (1.2) | (2.0) | (3.1) | (1.2) | (0.8) | (2.1) | (-) | (3.7) | (-) |
| SSGD-OTHER (N=532; n=52) | Male | % | 19 | 31 | 19 | 10 | 6 | 5 | - | 5 | 6 |
| | | S.E. | (2.7) | (2.7) | (2.5) | (1.5) | (2.2) | (1.3) | (-) | (1.1) | (-) |
| | Female | % | 11 | 13 | 11 | 4 | 1 | 1 | - | 56 | 3 |
| | | S.E. | (1.6) | (1.8) | (1.6) | (0.8) | (0.4) | (0.5) | (-) | (2.6) | (-) |

Note: If a student responded for more than one of natural father (mother), adoptive father (mother) and male (female) guardian, the response for natural father (mother) was used if there was one, otherwise the response for adoptive father (mother) was used.

[a] If an occupation was given, the first digit of the scale value assigned that occupation by Blishen (1967) was recorded. The higher the level an occupation is assigned on the scale, the higher the socio-economic status of the occupation.

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.13

Effect of Availability/Unavailability of French Language Programs on Plans for Postsecondary Education (Estimated Percentage of Each Group in the Population)

| Group | | Category of Response[a] 1 | 2 | 3 | 4 | 5 | No Response |
|---|---|---|---|---|---|---|---|
| SSHGD-POSTSEC | % | 90 | - | 5 | 3 | - | 2 |
| (N=3060; n=52) | S.E. | (0.7) | (-) | (0.5) | (0.4) | (-) | (-) |
| SSHGD-OTHER | % | 91 | 1 | 3 | 1 | - | 5 |
| (N=696; n=52) | S.E. | (1.3) | (0.4) | (0.6) | (0.3) | (-) | (-) |
| SSGD-SEC | % | 90 | 1 | 4 | 3 | - | 2 |
| (N=960; n=52) | S.E. | (1.1) | (0.7) | (0.7) | (0.8) | (-) | (-) |
| SSGD-POSTSEC | % | 86 | 1 | 5 | 6 | - | 3 |
| (N=302; n=52) | S.E. | (2.2) | (0.6) | (1.1) | (1.5) | (-) | (-) |
| SSGD-OTHER | % | 87 | 3 | 3 | 2 | - | 6 |
| (N=532; n=52) | S.E. | (2.2) | (0.8) | (1.0) | (0.5) | (-) | (-) |

TABLE 3.13 (continued)

[a]Students responded to the following question: Suppose that in Ontario all postsecondary educational programs now available in English were also available in French. In what way, if any, would this affect your present plans for postsecondary education?

1. There would be no change in my plans.
2. I do not now plan to pursue postsecondary education. I would do so if an appropriate course in French were available.
3. I now plan to pursue postsecondary education in English. I would pursue the <u>same</u> course in French if it were available.
4. I now plan to pursue postsecondary education in English. I would pursue a <u>different</u> course in French if it were available.
5. I now plan to pursue postsecondary education in French. I would pursue a <u>different</u> course in French if it were available.

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.14

Sex Distribution and Median Age of Atkinson Students

| Group | (Percent of Population) Male | Female | (of Population) Median Age |
|---|---|---|---|
| ATKINSON-POSTSEC (N=7418) | 56 | 44 | 18.0 |
| ATKINSON-WORK (N=1986) | 60 | 40 | 18.3 |

Note: Based on statistics reported in Table I.2.a of Fleming (1957).

TABLE 3.15

Level of Education Attained by Parents of Atkinson Students
(Reported as Percentage of the Population)

| Group | Parent/ Guardian | No Secondary School | Attended Secondary School but not University | Attended University | Unknown or No Response |
|---|---|---|---|---|---|
| ATKINSON-POSTSEC (N=7418) | Male | 35 | 41 | 22 | 2 |
| | Female | 27 | 61 | 10 | 2 |
| ATKINSON-WORK (N=1986) | Male | 48 | 38 | 11 | 3 |
| | Female | 37 | 56 | 5 | 3 |
| SSHGD-POSTSEC (N=3060; n=52) | Male | 20 | 43 | 32 | 5 |
| | Female | 17 | 51 | 27 | 4 |
| SSHGD-OTHER (N=696; n=52) | Male | 24 | 38 | 25 | 11 |
| | Female | 15 | 56 | 20 | 8 |

Note: Results for Atkinson students are based on tables II.11 to II.14 inclusive in the report by Fleming (1957). Results for SSHGD-POSTSEC and SSHGD-OTHER are based on Table 3.11 (see text).

TABLE 3.16

Percentage of Students in Each SSHGD Group
Who had Accumulated a Specified Number
of Credits or More by June 1976

| Type of Credit/Number of Credits | | SSHGD-POSTSEC (N=1808; n=52) | SSHGD-OTHER (N=430; n=52) | ABSENTEES (N=1172; n=52) |
|---|---|---|---|---|
| 1. Total | | | | |
| 33 | % | 85 | 74 | 69 |
| | S.E. | (2.3) | (3.7) | (2.9) |
| 34 | % | 78 | 63 | 59 |
| | S.E. | (2.4) | (3.7) | (2.9) |
| 35 | % | 68 | 49 | 46 |
| | S.E. | (2.7) | (3.4) | (2.9) |
| 37 | % | 34 | 21 | 19 |
| | S.E. | (2.5) | (2.3) | (2.0) |
| 39 | % | 5 | 1 | 2 |
| | S.E. | (0.9) | (0.5) | (0.3) |
| 2. Advanced | | | | |
| 16 | % | 88 | 84 | 79 |
| | S.E. | (2.3) | (2.5) | (2.5) |
| 20 | % | 80 | 72 | 65 |
| | S.E. | (2.4) | (3.2) | (2.8) |
| 24 | % | 68 | 38 | 38 |
| | S.E. | (3.0) | (3.7) | (2.7) |
| 28 | % | 21 | 10 | 12 |
| | S.E. | (2.2) | (1.8) | (1.6) |
| 32 | % | 3 | 1 | 1 |
| | S.E. | (0.7) | (0.4) | (0.7) |

TABLE 3.16 (continued)

| Type of Credit/Number of Credits | | SSHGD-POSTSEC (N=1808; n=52) | SSHGD-OTHER (N=430; n=52) | ABSENTEES (N=1172; n=52) |
|---|---|---|---|---|
| 3. English | | | | |
| 4 | % | 91 | 89 | 86 |
| | S.E. | (1.5) | (1.8) | (1.8) |
| 5 | % | 77 | 72 | 67 |
| | S.E. | (2.3) | (3.1) | (2.5) |
| 6 | % | 24 | 24 | 25 |
| | S.E. | (2.2) | (3.0) | (2.3) |
| 7 | % | 5 | 6 | 4 |
| | S.E. | (1.4) | (0.9) | (0.8) |
| 4. Mathematics | | | | |
| 3 | % | 92 | 92 | 86 |
| | S.E. | (1.4) | (1.8) | (1.6) |
| 4 | % | 86 | 80 | 77 |
| | S.E. | (1.5) | (2.8) | (1.9) |
| 5 | % | 73 | 57 | 53 |
| | S.E. | (1.9) | (3.3) | (2.4) |
| 6 | % | 66 | 38 | 37 |
| | S.E. | (2.1) | (3.5) | (2.4) |
| 7 | % | 29 | 19 | 17 |
| | S.E. | (2.3) | (2.7) | (1.5) |
| 8 | % | 6 | 2 | 3 |
| | S.E. | (1.4) | (0.8) | (0.9) |
| 5. Traditional academic | | | | |
| 18 | % | 89 | 89 | 81 |
| | S.E. | (2.1) | (2.1) | (2.2) |
| 22 | % | 80 | 70 | 64 |
| | S.E. | (2.6) | (3.3) | (2.9) |
| 26 | % | 50 | 32 | 31 |
| | S.E. | (2.6) | (3.4) | (2.2) |
| 30 | % | 12 | 7 | 6 |
| | S.E. | (1.5) | (1.4) | (1.3) |

TABLE 3.17

Percentage of Students in Each SSHGD Group Who Were Taking a Specified Number of Courses or More During 1975-76

| Type of Course/ Number of Courses | | SSHGD- POSTSEC (N=1808; n=52) | SSHGD- OTHER (N=430; n=52) | ABSENTEES (N=1172; n=52) |
|---|---|---|---|---|
| 1. Total | | | | |
| 4 | % | 96 | 88 | 80 |
| | S.E. | (0.6) | (2.1) | (2.1) |
| 5 | % | 89 | 75 | 69 |
| | S.E. | (1.2) | (3.2) | (2.6) |
| 6 | % | 72 | 57 | 47 |
| | S.E. | (2.4) | (3.7) | (3.1) |
| 7 | % | 19 | 9 | 8 |
| | S.E. | (1.9) | (1.6) | (1.3) |
| 8 | % | 3 | 1 | 1 |
| | S.E. | (0.7) | (0.5) | (0.3) |
| 2. Languages | | | | |
| 1 | % | 85 | 83 | 73 |
| | S.E. | (2.2) | (2.8) | (2.5) |
| 2 | % | 36 | 38 | 30 |
| | S.E. | (2.2) | (3.5) | (2.4) |
| 3 | % | 11 | 8 | 7 |
| | S.E. | (1.2) | (1.6) | (1.0) |
| 4 | % | 3 | 2 | 2 |
| | S.E. | (0.5) | (0.6) | (0.5) |

TABLE 3.17 (continued)

| Type of Course/ Number of Courses | | SSHGD-POSTSEC (N=1808; n=52) | SSHGD-OTHER (N=430; n=52) | ABSENTEES (N=1172; n=52) |
|---|---|---|---|---|
| 3. History/Geography/Social Science | | | | |
| 1 | % | 53 | 60 | 54 |
| | S.E. | (2.4) | (3.5) | (2.3) |
| 2 | % | 19 | 26 | 19 |
| | S.E. | (1.6) | (2.7) | (2.1) |
| 3 | % | 4 | 6 | 4 |
| | S.E. | (0.8) | (1.3) | (1.1) |
| 4. Mathematics/Science | | | | |
| 1 | % | 82 | 78 | 70 |
| | S.E. | (2.2) | (3.1) | (2.8) |
| 2 | % | 59 | 49 | 44 |
| | S.E. | (2.6) | (3.8) | (2.5) |
| 3 | % | 31 | 19 | 20 |
| | S.E. | (2.6) | (2.6) | (2.0) |
| 4 | % | 9 | 3 | 4 |
| | S.E. | (1.5) | (0.9) | (0.9) |

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.18

Percentage of Students in Each SSGD Group Who had Accumulated a Specified Number of Credits or More by June 1976

| Type of Credit/ Number of Credits | | SSGD-SEC (N=945; n=51) | SSGD-POSTSEC (N=295; n=51) | SSGD-OTHER (N=516; n=51) | ABSENTEES (N=802; n=51) |
|---|---|---|---|---|---|
| 1. Total | | | | | |
| 27 | % | 89 | 87 | 83 | 75 |
| | S.E. | (1.3) | (3.9) | (2.4) | (1.9) |
| 28 | % | 79 | 70 | 65 | 54 |
| | S.E. | (1.5) | (4.0) | (3.1) | (2.4) |
| 29 | % | 66 | 51 | 34 | 39 |
| | S.E. | (2.4) | (4.3) | (2.7) | (2.3) |
| 31 | % | 31 | 18 | 7 | 14 |
| | S.E. | (2.9) | (2.9) | (1.6) | (1.6) |
| 33 | % | 2 | 3 | - | 4 |
| | S.E. | (0.9) | (1.4) | (-) | (1.1) |
| 2. Advanced | | | | | |
| 1 | % | 94 | 79 | 72 | 77 |
| | S.E. | (1.3) | (4.4) | (3.3) | (2.3) |
| 5 | % | 91 | 68 | 54 | 63 |
| | S.E. | (2.1) | (4.6) | (4.1) | (3.0) |

TABLE 3.18 (continued)

| Type of Credit/ Number of Credits | | SSGD- SEC (N=945; n=51) | SSGD- POSTSEC (N=295; n=51) | SSGD- OTHER (N=516; n=51) | ABSENTEES (N=802; n=51) |
|---|---|---|---|---|---|
| 10 | % | 87 | 51 | 32 | 53 |
| | S.E. | (2.3) | (5.1) | (3.9) | (3.0) |
| 15 | % | 70 | 26 | 17 | 34 |
| | S.E. | (2.9) | (3.5) | (3.0) | (2.5) |
| 20 | % | 34 | 4 | 5 | 16 |
| | S.E. | (2.9) | (1.2) | (2.2) | (2.1) |
| 24 | % | 3 | 1 | - | 1 |
| | S.E. | (0.7) | (0.4) | (-) | (0.4) |
| 3. English | | | | | |
| 3 | % | 96 | 95 | 93 | 89 |
| | S.E. | (0.9) | (2.8) | (1.7) | (1.3) |
| 4 | % | 85 | 82 | 78 | 72 |
| | S.E. | (1.6) | (3.7) | (2.5) | (1.7) |
| 5 | % | 11 | 12 | 10 | 13 |
| | S.E. | (1.7) | (2.0) | (2.0) | (1.9) |
| 6 | % | 2 | 2 | 2 | 3 |
| | S.E. | (0.5) | (1.0) | (0.8) | (1.0) |

TABLE 3.18 (continued)

| Type of Credit/ Number of Credits | | SSGD- SEC (N=945; n=51) | SSGD- POSTSEC (N=295; n=51) | SSGD- OTHER (N=516; n=51) | ABSENTEES (N=802; n=51) |
|---|---|---|---|---|---|
| 4. Mathematics | | | | | |
| 3 | % | 91 | 83 | 79 | 78 |
| | S.E. | (1.3) | (3.7) | (2.1) | (1.6) |
| 4 | % | 76 | 65 | 52 | 53 |
| | S.E. | (2.0) | (7.8) | (3.2) | (2.4) |
| 5 | % | 12 | 6 | 5 | 7 |
| | S.E. | (1.8) | (1.9) | (1.6) | (1.6) |
| 6 | % | 3 | 2 | 2 | 2 |
| | S.E. | (1.2) | (1.1) | (1.1) | (0.6) |
| 5. Traditional academic | | | | | |
| 10 | % | 95 | 92 | 90 | 87 |
| | S.E. | (1.1) | (3.2) | (2.3) | (2.1) |
| 15 | % | 83 | 66 | 48 | 55 |
| | S.E. | (2.7) | (4.6) | (4.0) | (2.7) |
| 20 | % | 44 | 13 | 9 | 22 |
| | S.E. | (3.0) | (2.8) | (2.4) | (2.4) |
| 25 | % | 5 | 1 | - | 2 |
| | S.E. | (0.9) | (0.5) | (-) | (0.6) |

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.19

Percentage of Students in Each SSGD Group Who were Taking a Specified Number of Courses or More During 1975-76

| Type of Course/ Number of Courses | | SSGD-SEC (N=945;n=51) | SSGD-POSTSEC (N=295;n=51) | SSGD-OTHER (N=516;n=51) | ABSENTEES (N=802;n=51) |
|---|---|---|---|---|---|
| 1. Total | | | | | |
| 3 | % | 93 | 90 | 82 | 76 |
| | S.E. | (1.0) | (3.3) | (3.2) | (2.4) |
| 4 | % | 84 | 76 | 68 | 64 |
| | S.E. | (2.1) | (4.1) | (3.9) | (3.1) |
| 5 | % | 69 | 60 | 50 | 47 |
| | S.E. | (2.9) | (4.3) | (4.2) | (3.3) |
| 6 | % | 43 | 35 | 28 | 27 |
| | S.E. | (3.3) | (4.0) | (3.7) | (2.7) |
| 7 | % | 21 | 13 | 12 | 11 |
| | S.E. | (2.8) | (3.0) | (2.8) | (1.9) |
| 8 | % | 5 | 5 | 5 | 4 |
| | S.E. | (1.9) | (2.3) | (2.3) | (1.3) |
| 2. Languages | | | | | |
| 1 | % | 89 | 82 | 77 | 73 |
| | S.E. | (2.3) | (3.9) | (3.5) | (2.6) |
| 2 | % | 40 | 19 | 12 | 21 |
| | S.E. | (2.6) | (3.4) | (2.6) | (2.2) |
| 3 | % | 7 | 3 | 1 | 3 |
| | S.E. | (1.6) | (1.2) | (0.7) | (0.9) |

TABLE 3.19 (continued)

| Type of Course/ Number of Courses | | SSGD- SEC (N=945;n=51) | SSGD- POSTSEC (N=295;n=51) | SSGD- OTHER (N=516;n=51) | ABSENTEES (N=802;n=51) |
|---|---|---|---|---|---|
| 3. History/Geography/Social Science | | | | | |
| 1 | % | 55 | 41 | 35 | 36 |
| | S.E. | (3.0) | (4.5) | (3.5) | (3.1) |
| 2 | % | 13 | 8 | 4 | 9 |
| | S.E. | (2.0) | (2.2) | (1.1) | (1.7) |
| 3 | % | 1 | 1 | - | - |
| | S.E. | (0.5) | (0.7) | (-) | (-) |
| 4. Mathematics/Science | | | | | |
| 1 | % | 84 | 77 | 65 | 64 |
| | S.E. | (2.2) | (3.8) | (3.7) | (2.9) |
| 2 | % | 51 | 32 | 24 | 32 |
| | S.E. | (3.8) | (3.5) | (3.3) | (2.4) |
| 3 | % | 8 | 3 | 2 | 4 |
| | S.E. | (2.2) | (1.3) | (1.1) | (0.9) |

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.20

Test of Reading Comprehension and Language Achievement--
Reading Comprehension Part
(On Scale from -2.5 to 10)

| Group | | Percentile | | | | |
|---|---|---|---|---|---|---|
| | | 10th | 25th | 50th | 75th | 90th |
| SSHGD-POSTSEC | | 1.7 | 3.5 | 5.1 | 6.7 | 8.2 |
| (N=3092; n=52) | S.E. | (0.2) | (0.1) | (0.1) | (0.1) | (0.1) |
| SSHGD-OTHER | | 1.2 | 3.0 | 4.6 | 6.2 | 7.7 |
| (N=691; n=52) | S.E. | (0.2) | (0.2) | (0.2) | (0.2) | (0.3) |
| SSGD-SEC | | 0.6 | 2.3 | 4.1 | 6.0 | 7.9 |
| (N=977; n=52) | S.E. | (0.2) | (0.2) | (0.1) | (0.1) | (0.2) |
| SSGD-POSTSEC | | -0.6 | 0.7 | 2.2 | 4.0 | 6.0 |
| (N=300; n=52) | S.E. | (0.2) | (0.2) | (0.2) | (0.3) | (0.4) |
| SSGD-WORK | | -0.6 | 0.7 | 2.2 | 3.7 | 5.3 |
| (N=532; n=52) | S.E. | (0.2) | (0.2) | (0.2) | (0.2) | (0.2) |

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.21

Test of Reading Comprehension
and Language Achievement (English)
First Language Achievement Part
(on Scale from -2.75 to 11)

| Group | | Percentile $10^{th}$ | $25^{th}$ | $50^{th}$ | $75^{th}$ | $90^{th}$ |
|---|---|---|---|---|---|---|
| SSHGD-POSTSEC | | 0.5 | 2.4 | 4.3 | 6.3 | 8.2 |
| (N=3092; n=52) | S.E. | (0.2) | (0.1) | (0.1) | (0.1) | (0.2) |
| SSHGD-OTHER | | 0.7 | 2.1 | 3.6 | 5.3 | 7.1 |
| (N=691; n=52) | S.E. | (0.2) | (0.2) | (0.2) | (0.2) | (0.2) |
| SSGD-SEC | | 0.2 | 1.9 | 3.6 | 5.4 | 7.3 |
| (N=977; n=52) | S.E. | (0.2) | (0.1) | (0.1) | (0.2) | (0.2) |
| SSGD-POSTSEC | | -0.8 | 0.5 | 2.0 | 3.8 | 6.0 |
| (N=300; n=52) | S.E. | (0.3) | (0.2) | (0.2) | (0.3) | (0.4) |
| SSGD-WORK | | -1.0 | 0.2 | 1.7 | 3.4 | 5.4 |
| (N=532; n=52) | S.E. | (0.2) | (0.2) | (0.2) | (0.2) | (0.3) |

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.22

Test of Reading Comprehension
and Language Achievement (English)
Second Language Achievement Part
(on Scale from -3.75 to 15)

| Group | | Percentile 10th | 25th | 50th | 75th | 90th |
|---|---|---|---|---|---|---|
| SSHGD-POSTSEC | | 3.6 | 5.9 | 8.0 | 10.1 | 12.0 |
| (N=3092; n=52) | S.E. | (0.2) | (0.2) | (0.2) | (0.1) | (0.1) |
| SSHGD-OTHER | | 3.8 | 5.8 | 7.7 | 9.5 | 11.4 |
| (N=691; n=52) | S.E. | (0.3) | (0.2) | (0.2) | (0.2) | (0.2) |
| SSGD-SEC | | 2.9 | 5.1 | 7.2 | 9.2 | 11.2 |
| (N-977; n=52) | S.E. | (0.2) | (0.2) | (0.2) | (0.2) | (0.2) |
| SSGD-POSTSEC | | 1.8 | 3.2 | 4.9 | 6.8 | 8.9 |
| (N=300; n=52) | S.E. | (0.3) | (0.2) | (0.3) | (0.3) | (0.4) |
| SSGD-WORK | | 1.7 | 3.4 | 5.3 | 7.4 | 9.6 |
| (N=532; n=52) | S.E. | (0.2) | (0.2) | (0.2) | (0.3) | (0.5) |

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.23

Test of Reading Comprehension
and Language Achievement (English)
(Scores on Scale from -9 to 36)

| Group | | Percentile 10th | 25th | 50th | 75th | 90th |
|---|---|---|---|---|---|---|
| SSHGD-POSTSEC | | 8.3 | 12.8 | 17.3 | 21.7 | 26.1 |
| (N=3092; n=52) | S.E. | (0.5) | (0.4) | (0.3) | (0.3) | (0.3) |
| SSHGD-OTHER | | 8.0 | 11.8 | 15.7 | 19.8 | 24.2 |
| (N=691; n=52) | S.E. | (0.5) | (0.5) | (0.5) | (0.5) | (0.6) |
| SSGD-SEC | | 5.6 | 10.3 | 14.9 | 19.4 | 23.8 |
| (N=977; n=52) | S.E. | (0.6) | (0.4) | (0.4) | (0.4) | (0.4) |
| SSGD-POSTSEC | | 3.0 | 5.2 | 8.6 | 13.3 | 19.3 |
| (N=300; n=52) | S.E. | (0.7) | (0.5) | (0.6) | (0.7) | (1.2) |
| SSGD-WORK | | 2.3 | 5.2 | 8.9 | 13.3 | 18.5 |
| (N=532; n=52) | S.E. | (0.5) | (0.4) | (0.5) | (0.6) | (1.0) |

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.24

Writing Test (English)
(Scores on Scale from 1 to 10)

| Group | | Percentile 10th | 25th | 50th | 75th | 90th |
|---|---|---|---|---|---|---|
| SSHGD-POSTSEC | | 4.7 | 5.7 | 6.6 | 7.4 | 8.1 |
| (N=624; n=51) | S.E. | (0.1) | (0.1) | (0.1) | (0.1) | (0.1) |
| SSHGD-OTHER | | 4.5 | 5.4 | 6.2 | 6.9 | 7.5 |
| (N=147; n=45) | S.E. | (0.2) | (0.1) | (0.1) | (0.1) | (0.1) |
| SSGD-SEC | | 4.2 | 5.0 | 5.8 | 6.6 | 7.5 |
| (N=445; n=52) | S.E. | (0.1) | (0.1) | (0.1) | (0.1) | (0.1) |
| SSGD-POSTSEC | | 3.7 | 4.5 | 5.3 | 6.0 | 6.7 |
| (N=129; n=47) | S.E. | (0.2) | (0.2) | (0.1) | (0.1) | (0.2) |
| SSGD-WORK | | 3.4 | 4.2 | 5.0 | 5.8 | 6.6 |
| (N=234; n=50) | S.E. | (0.2) | (0.1) | (0.1) | (0.1) | (0.2) |

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.25

Test of Arithmetic and Basic Algebra
(On a scale from -8.75 to 35)

| Group | | Percentile 10th | 25th | 50th | 75th | 90th |
|---|---|---|---|---|---|---|
| SSGD-SEC | | 7.5 | 14.3 | 20.5 | 25.9 | 30.7 |
| (N=927; n=52) | S.E. | (0.7) | (0.5) | (0.5) | (0.4) | (0.5) |
| SSGD-POSTSEC | | 2.0 | 6.7 | 19.0 | 17.5 | 23.5 |
| (N=268; n=50) | S.E. | (0.8) | (0.8) | (0.8) | (0.9) | (1.2) |
| SSGD-WORK | | 0.8 | 4.7 | 9.0 | 13.8 | 19.2 |
| (N=468; n=51) | S.E. | (0.7) | (0.5) | (0.5) | (0.6) | (0.9) |

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.26

Mathematics Achievement Test
(Scores on Scale from -4.5 to 36)

| Group | | Percentile 10th | 25th | 50th | 75th | 90th |
|---|---|---|---|---|---|---|
| SSHGD-POSTSEC | | 9.7 | 13.0 | 16.6 | 20.5 | 24.8 |
| (N=1252; n=52) | S.E. | (0.4) | (0.3) | (0.3) | (0.3) | (0.4) |
| SSHGD-OTHER | | 7.7 | 11.4 | 15.0 | 18.6 | 22.1 |
| (N=174; n=46) | S.E. | (1.1) | (0.8) | (0.8) | (0.8) | (1.1) |
| SSHGD-1968 (N=24232; n is unknown) | | 9.1 | 11.8 | 15.5 | 19.6 | 24.0 |

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.27

Tests of French as a Second Language--
Reading Test[a]
(On a Scale from -13 to 39)

| Group | | Percentile | | | | |
|---|---|---|---|---|---|---|
| | | $10^{th}$ | $25^{th}$ | $50^{th}$ | $75^{th}$ | $90^{th}$ |
| SSHGD-POSTSEC | | 12.9 | 17.4 | 22.0 | 26.8 | 31.6 |
| (N=553; n=49) | S.E. | (0.9) | (0.7) | (0.7) | (0.7) | (0.7) |
| SSHGD-OTHER | | 12.2 | 16.5 | 21.3 | 26.5 | 32.2 |
| (N=96; n=31) | S.E. | (1.4) | (1.2) | (1.3) | (1.4) | (1.8) |
| Other Countries[b] | | | | | | |
| Chile (N=1440) | | | | 6.6 | | |
| England (N=701) | | | | 32.1 | | |
| Netherlands (N=1756) | | | | 26.3 | | |
| New Zealand (N=362) | | | | 27.4 | | |
| Rumania (N=2251) | | | | 28.6 | | |
| Scotland (N=973) | | | | 25.2 | | |
| Sweden (N=1754) | | | | 19.6 | | |
| United States (N=3068) | | | | 17.5 | | |

Note: N is the number of students; n is the number of secondary schools.

[a]Ontario results are based on a test containing a number of changes in wording from the test used in the other countries.

[b]The results for other countries have been taken from Carroll (1975, pp. 164-165) and consist of mean scores, not medians.

TABLE 3.28

Tests of French as a Second Language--
Listening Test[a]
(On a Scale from -11.33 to 34)

| Group | Percentile 10th | 25th | 50th | 75th | 90th |
|---|---|---|---|---|---|
| SSHGD-POSTSEC (N=455; n=47) | 7.9 (1.2) | 13.8 (1.0) | 19.4 (0.9) | 24.7 (0.9) | 29.7 (1.1) |
| SSHGD-OTHER (N=78; n=28) | 5.9 (2.6) | 13.0 (1.9) | 19.5 (1.8) | 25.1 (1.8) | 30.1 (2.2) |
| Other Countries[b] | | | | | |
| Chile (N=173) | | | 3.2 | | |
| England (N=180) | | | 27.9 | | |
| New Zealand (N=361) | | | 12.8 | | |
| Rumania (N=77) | | | 26.2 | | |
| Scotland (N=973) | | | 17.3 | | |
| Sweden (N=1743) | | | 19.3 | | |
| United States (N=1320) | | | 13.8 | | |

Note: N is the number of students; n is the number of secondary schools.

[a]Ontario results are based on a test containing six fewer items than the test used in the other countries. In addition, the procedure for administering part of the test was modified for use in Ontario (see text for explanation).

[b]The results for other countries have been taken from Carroll's report (1975, pp. 164-165) and consist of mean scores, not medians.

TABLE 3.29

Tests of French as a Second Language--
Writing Test

| | Writing I | | | Writing II | | |
|---|---|---|---|---|---|---|
| | N | Mean | S.D. | N | Mean | S.D. |
| Ontario - Combined SSHGD | 54 | 20.8 | 7.5 | 54 | 82.3 | 29.1 |
| Other Countries | | | | | | |
| Chile | 156 | 3.4 | 3.4 | 148 | 28.0 | 21.9 |
| England | 177 | 31.4 | 6.5 | 181 | 86.4 | 28.5 |
| New Zealand | 353 | 23.4 | 7.7 | 362 | 73.2 | 26.0 |
| Rumania | 2254 | 28.0 | 11.3 | 2077 | 62.4 | 33.0 |
| Scotland | 974 | 22.2 | 9.2 | 966 | 79.3 | 30.1 |
| Sweden | 1709 | 15.8 | 8.4 | 1670 | 67.4 | 28.2 |
| United States | 1751 | 16.0 | 8.8 | 1776 | 57.6 | 27.3 |

TABLE 3.30

Tests of French as a Second Language--
Speaking Test

| | Total Speaking Fluency | | |
|---|---|---|---|
| | N | Mean | S.D. |
| Ontario - Combined SSHGD | 50 | 96.3 | 37.8 |
| Other Countries | | | |
| Chile | 132 | 28.3 | 25.1 |
| England | 82 | 111.4 | 34.0 |
| New Zealand | 150 | 93.1 | 29.3 |
| Rumania | 63 | 137.6 | 39.5 |
| Scotland | 237 | 96.6 | 32.3 |
| Sweden | 187 | 107.9 | 41.8 |
| United States | 178 | 91.8 | 37.1 |

TABLE 3.31

Physics Achievement Test
(On a Scale from -7.5 to 60)

| Group | | Percentile | | | | |
|---|---|---|---|---|---|---|
| | | $10^{th}$ | $25^{th}$ | $50^{th}$ | $75^{th}$ | $90^{th}$ |
| SSHGD-POSTSEC | | 4.2 | 8.2 | 13.4 | 20.0 | 27.9 |
| (N=557; n=52) | S.E. | (0.8) | (0.7) | (0.8) | (0.8) | (1.0) |
| SSHGD-OTHER | | 3.5 | 5.7 | 9.8 | 15.7 | 23.5 |
| (N=98; n=42) | S.E. | (1.2) | (1.1) | (1.1) | (1.4) | (2.2) |
| SSHGD-1970 | | 7.6 | 11.7 | 17.2 | 24.2 | 31.7 |
| (N=6484; n is unknown) | | | | | | |

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.32

Coefficients of Correlation or Multiple Correlation Between Marks in Selected Courses and Scores in Selected Tests

| Criterion | Predictor(s)[a] | N | n | r |
|---|---|---|---|---|
| SSHGD Course Marks | | | | |
| English | Set 1 | 483 | 50 | 0.58 |
| French | Set 2 | 270 | 47 | 0.69 |
| Mathematics[b] | MAT | 842 | 51 | 0.65 |
| Physics | PAT | 376 | 52 | 0.60 |
| SSGD Course Marks | | | | |
| Advanced English | Set 1 | 450 | 47 | 0.49 |
| General English | Set 1 | 220 | 46 | 0.49 |
| Advanced Mathematics | TAA | 684 | 46 | 0.61 |
| General Mathematics | TAA | 420 | 43 | 0.47 |

Note: N is the number of students, n the number of schools, and r the coefficient of correlation.

[a]The code to the predictors is as follows:

Set 1--the three subtests (parts) of the _Test of Reading Comprehension and Language Achievement (English)_ and the _Writing Test_.

Set 2--the _Reading_ and _Listening Test_ from the _Tests of French as a Second Language_.

MAT--_Mathematics Achievement Test_

PAT--_Physics Achievement Test_

TAA--_Test of Arithmetic and Basic Algebra_

[b]This was the mean of marks in the calculus course and the relations and functions course.

TABLE 3.33

Correlation Coefficients Between the Observed Mean Course Mark and the Predicted Mean Course Mark

| | Number of Schools | | Correlation Coefficients | |
|---|---|---|---|---|
| | Untrimmed | Trimmed[a] | Untrimmed | Trimmed[a] |
| SSHGD Course | | | | |
| English | 50 | 48 | 0.37 | 0.26 |
| French | 47 | 30 | 0.53 | 0.45 |
| Mathematics | 51 | 49 | 0.30 | 0.25 |
| Physics | 52 | 46 | 0.41 | 0.39 |
| SSGD Course | | | | |
| Advanced English | 47 | 46 | 0.39 | 0.39 |
| General English | 46 | 31 | 0.20 | 0.14 |
| Advanced Mathematics | 46 | 46 | 0.33 | 0.33 |
| General Mathematics | 43 | 40 | 0.02 | 0.11 |

[a] All schools for which the means were based on fewer than four observations were excluded from the computation of the trimmed correlation coefficient.

TABLE 3.34

Coefficient of Correlation Between
Predicted Mean Course Mark
and the Difference Between Observed and Predicted
Mean Course Marks

| | Number of Schools | | Correlation Coefficients | |
|---|---|---|---|---|
| | Untrimmed | Trimmed[a] | Untrimmed | Trimmed[a] |
| SSHGD Course | | | | |
| English | 50 | 48 | -0.27 | -0.44 |
| French | 47 | 30 | -0.24 | -0.25 |
| Mathematics | 51 | 49 | -0.29 | -0.45 |
| Physics | 52 | 46 | -0.36 | -0.35 |
| SSGD Course | | | | |
| Advanced English | 47 | 46 | -0.22 | -0.22 |
| General English | 46 | 31 | -0.26 | -0.41 |
| Advanced Mathematics | 46 | 46 | -0.47 | -0.48 |
| General Mathematics | 43 | 40 | -0.45 | -0.40 |

[a]All schools for which the means were based on fewer than four observations were excluded from the computation of the trimmed correlation coefficient.

TABLE 3.35

Coefficients of Intercorrelation among Observed Minus Predicted Mean Marks for SSHGD-Level Courses

| Course | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1. English | | 30<br>(26) | 41<br>(45) | 05<br>(42) |
| 2. French | 19<br>(45) | | 33<br>(29) | 23<br>(27) |
| 3. Mathematics | 34<br>(49) | 15<br>(46) | | 17<br>(44) |
| 4. Physics | 17<br>(50) | 02<br>(47) | 17<br>(51) | |

Note: Correlation coefficients based on the untrimmed sample of schools lie below the diagonal, those for the trimmed sample lie above the diagonal. Decimal points have been omitted from the coefficients. The number of schools on which a coefficient was based is given below it in parentheses.

TABLE 3.36

Coefficients of Intercorrelation among Observed Minus Predicted Mean Marks for SSGD-Level Courses

| Course | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1. Advanced English | | 12<br>(27) | 48<br>(43) | 09<br>(37) |
| 2. General English | -07<br>(43) | | 26<br>(29) | 27<br>(27) |
| 3. Advanced Mathematics | 48<br>(44) | 03<br>(43) | | 25<br>(37) |
| 4. General Mathematics | 04<br>(40) | 21<br>(41) | 19<br>(40) | |

Note: Correlation coefficients based on the untrimmed sample of schools lie below the diagonal, those based on the trimmed sample lie above the diagonal. Decimal points have been omitted from the coefficients. The number of schools on which a coefficient was based is given below it in parentheses.

TABLE 3.37

Selected Percentile Points of the Distribution of Differences Between Observed and Predicted Mean Marks and the Standard Deviation of the Distribution of Marks

| Course | n | Percentiles 25th | 50th | 75th | N | S.D. |
|---|---|---|---|---|---|---|
| SSHGD | | | | | | |
| English | 50 | -2.1 | 0.7 | 2.9 | 2678 | 11.2 |
| French | 47 | -4.2 | -1.3 | 4.0 | 690 | 11.5 |
| Mathematics | 51 | -3.7 | -0.6 | 3.2 | 2177 | 14.5 |
| Physics | 52 | -3.7 | 0.6 | 3.2 | 1168 | 13.3 |
| SSGD | | | | | | |
| Advanced English | 47 | -3.3 | 0.1 | 3.5 | 1317 | 11.7 |
| General English | 46 | -3.4 | 0.5 | 4.5 | 779 | 10.8 |
| Advanced Mathematics | 46 | -4.5 | 1.1 | 3.8 | 943 | 14.3 |
| General Mathematics | 43 | -3.7 | 1.1 | 3.8 | 623 | 13.6 |

Note: n was the number of schools for which data were available from the distribution of differences between observed and prediction mean marks; N was the number of students for whom school marks were obtained.

TABLE 3.38

Regression Coefficients and the Multiple Correlation Coefficient from the SSGD Multiple Regression Analysis of the Test of Reading Comprehension and Language Achievement (English)

| Predictor Variable | Reg. Coef. (B) | S.E. of B |
|---|---|---|
| Age | -2.57 | 0.26 |
| Sex (1=Female;2=Male) | -0.77 | 0.32 |
| Language Spoken at Home (1=Other; 2=English) | 0.30 | 0.50 |
| Education of Father/Male Guardian | 0.48 | 0.12 |
| Education of Mother/Female Guardian | 0.31 | 0.11 |
| Occupation of Father/Male Guardian | 0.39 | 0.13 |
| Occupation of Mother/Female Guardian (1=Employed; 0=Other) | -0.37 | 0.32 |
| Total Number of Credits in English | 1.19 | 0.24 |
| Total Number of Credits in Mathematics | 0.91 | 0.17 |
| Multiple Correlation Coefficient: | 0.41 | |

TABLE 3.39

Regression Coefficients and the Multiple Correlation Coefficient from the SSGD Multiple Regression Analysis of the Writing Test

| Predictor Variable | Reg. Coef. (B) | S.E. of B |
|---|---|---|
| Age | -0.36 | 0.07 |
| Sex (1=Female; 2=Male) | -0.45 | 0.09 |
| Language Spoken at Home (1=Other; 2=English) | 0.00 | 0.14 |
| Education of Father/Male Guardian | 0.11 | 0.03 |
| Education of Mother/Female Guardian | -0.01 | 0.03 |
| Occupation of Father/Male Guardian | 0.02 | 0.03 |
| Occupation of Mother/Female Guardian (1=Employed; 0=Other) | 0.00 | 0.09 |
| Total Number of Credits in English | 0.29 | 0.06 |
| Total Number of Credits in Mathematics | 0.11 | 0.05 |
| Multiple Correlation Coefficient: | 0.39 | |

TABLE 3.40

Regression Coefficients and the Multiple Correlation Coefficients from the SSGD Multiple Regression Analysis of the Test of Arithmetic and Basic Algebra

| Predictor Variable | Reg. Coef. (B) | S.E. of B |
|---|---|---|
| Age | -2.71 | 0.34 |
| Sex (1=Female; 2=Male) | 1.28 | 0.41 |
| Language Spoken at Home (1=Other; 2=English) | -0.06 | 0.64 |
| Education of Father/Male Guardian | 0.72 | 0.15 |
| Education of Mother/Female Guardian | 0.28 | 0.15 |
| Occupation of Father/Male Guardian | 0.18 | 0.17 |
| Occupation of Mother/Female Guardian (1=Employed; 0=Other) | -0.18 | 0.41 |
| Total Number of Credits in English | 0.27 | 0.31 |
| Total Number of Credits in Mathematics | 3.96 | 0.21 |

Multiple Correlation Coefficient: 0.53

TABLE 3.41

Regression Coefficients and the Multiple Correlation Coefficient from the SSGD Multiple Regression Analysis of Future Plans

| Predictor Variable | Reg. Coef. (B) | S.E. of B |
|---|---|---|
| Age | -0.25 | 0.03 |
| Sex (1=Female; 2=Male) | 0.07 | 0.04 |
| Language Spoken at Home (1=Other; 2=English) | -0.21 | 0.62 |
| Education of Father/Male Guardian | 0.04 | 0.01 |
| Education of Mother/Female Guardian | 0.05 | 0.01 |
| Occupation of Father/Male Guardian | 0.04 | 0.02 |
| Occupation of Mother/Female Guardian (1=Employed;0=Other) | 0.03 | 0.04 |
| Total Number of Credits in English | 0.02 | 0.03 |
| Total Number of Credits in Mathematics | 0.17 | 0.02 |
| Multiple Correlation Coefficient: | 0.36 | |

Note: The categories of responses for Future Plans were as follows: 3 = plan to continue secondary school studies; 2 = plan to undertake postsecondary studies; 1 = other plans.

TABLE 3.42

Regression Coefficients and the Multiple Correlation Coefficient from the SSHGD Multiple Regression Analysis of the <u>Test of Reading Comprehension and Language Achievement (English)</u>

| Predictor Variable | Reg. Coef. (B) | S.E. of B |
|---|---|---|
| Age | -2.17 | 0.23 |
| Sex (1=Female; 2=Male) | -1.10 | 0.30 |
| Language Spoken at Home (1=Other; 2=English) | 2.30 | 0.51 |
| Education of Father/Male Guardian | 0.08 | 0.10 |
| Education of Mother/Female Guardian | 0.29 | 0.11 |
| Occupation of Father/Male Guardian | 0.21 | 0.11 |
| Occupation of Mother/Female Guardian (1=Employed; 0=Other) | -0.20 | 0.29 |
| Total Number of Credits in English | 0.89 | 0.16 |
| Total Number of Credits in Mathematics | 0.55 | 0.09 |
| Multiple Correlation Coefficient: | 0.34 | |

TABLE 3.43

Regression Coefficients and the Multiple Correlation Coefficient from the SSHGD Multiple Regression Analysis of the Writing Test

| Predictor Variable | Reg. Coef. (B) | S.E. of B |
|---|---|---|
| Age | -0.26 | 0.08 |
| Sex (1=Female; 2=Male) | -0.36 | 0.10 |
| Language Spoken at Home (1=Other; 2=English) | 0.02 | 0.18 |
| Education of Father/Male Guardian | -0.01 | 0.04 |
| Education of Mother/Female Guardian | 0.09 | 0.04 |
| Occupation of Father/Male Guardian | 0.06 | 0.04 |
| Occupation of Mother/Female Guardian (1=Employed; 0=Other) | 0.10 | 0.10 |
| Multiple Correlation Coefficient: | 0.29 | |

Note: Program variables were not included in this analysis because the sample of students for which there were both test scores and program data was irretrievably biased relative to the school populations.

Table 3.44

Regression Coefficients and the Multiple Correlation Coefficient from the SSHGD Multiple Regression Analysis of the *Mathematics Achievement Test*

| Predictor Variable | Reg. Coef. (B) | S.E. of B |
|---|---|---|
| Age | -1.44 | 0.31 |
| Sex (1=Female; 2=Male) | 0.99 | 0.39 |
| Language Spoken at Home (1=Other; 2=English) | 0.33 | 0.67 |
| Education of Father/Male Guardian | -0.36 | 0.14 |
| Education of Mother/Female Guardian | 0.35 | 0.14 |
| Occupation of Father/Male Guardian | 0.25 | 0.14 |
| Occupation of Mother/Female Guardian (1=Employed; 0=Other) | -0.46 | 0.38 |
| Total Number of Credits in English | 0.10 | 0.21 |
| Total Number of Credits in Mathematics | 1.21 | 0.12 |
| Multiple Correlation Coefficient: | 0.41 | |

TABLE 3.45

Regression Coefficients and the Multiple Correlation Coefficient from the SSHGD Multiple Regression Analysis of Future Plans

| Predictor Variable | Reg. Coef. (B) | S.E. of B |
|---|---|---|
| Age | -0.00 | 0.01 |
| Sex (1=Female; 2=Male) | -0.05 | 0.02 |
| Language Spoken at Home (1=Other; 2=English) | -0.11 | 0.03 |
| Education of Father/Male Guardian | 0.02 | 0.01 |
| Education of Mother/Female Guardian | 0.00 | 0.01 |
| Occupation of Father/Male Guardian | 0.00 | 0.01 |
| Occupation of Mother/Female Guardian (1=Employed; 0=Other) | 0.00 | 0.02 |
| Total Number of Credits in English | 0.01 | 0.01 |
| Total Number of Credits in Mathematics | 0.04 | 0.01 |
| Multiple Correlation Coefficient: | 0.20 | |

Note: Future Plans were coded as follows: 5 = plan to undertake postsecondary studies; 4 = other plans.

TABLE 3.46

Variances by Which to Test the
Statistical Significance
of School Effects

| School Effect | Variance of School Effect | Residual Variance | F-ratio | d.f. |
|---|---|---|---|---|
| SSGD SAMPLE | | | | |
| 1. Effect for Test of Reading Comprehension and Language Achievement | 73.95 | 39.39 | 1.88 | 50;1692 |
| 2. Effect for the Writing Test | 2.19 | 1.31 | 1.67 | 50;750 |
| 3. Effect for the Test of Arithmetic and Basic Algebra | 167.01 | 58.38 | 2.86 | 50;1518 |
| 4. Effect for Future Plans | 1.49 | 0.61 | 2.43 | 50;1692 |
| SSHGD SAMPLE | | | | |
| 1. Effect for the Test of Reading Comprehension and Language Achievement | 91.48 | 39.27 | 2.33 | 51;2075 |
| 2. Effect for Future Plans | 0.23 | 0.14 | 1.61 | 51;2084 |

TABLE 3.47

Coefficients of Correlation
Among School Effects

| SSGD SAMPLE (n=51 schools) | 1 | 2 | 3 |
|---|---|---|---|
| 1. Effect for the Test of Reading Comprehension and Language Achievement | - | | |
| 2. Effect for the Writing Test | 0.52 | - | |
| 3. Effect for the Test of Arithmetic and Basic Algebra | 0.45 | 0.11 | - |
| 4. Effect for Future Plans | 0.26 | 0.16 | 0.46 |

| SSHGD SAMPLE (n=52 schools) | 1 |
|---|---|
| 1. Effect for the Test of Reading Comprehension and Language Achievement | - |
| 2. Effect for Future Plans | 0.35 |

TABLE 3.48

Type of Postsecondary Institution to Which Students Have Applied for Admission (Estimated Percentage of Each Group in the Population)

| Group | | University[a] | CAAT[b] | Other[c] | No Response |
|---|---|---|---|---|---|
| SSHGD-POSTSEC (N=472; n=14) | % | 71 | 22 | 3 | 3 |
| | S.E. | (2.6) | (2.3) | (1.1) | (-) |
| SSGD-POSTSEC (N=104; n=14) | % | 10 | 69 | 8 | 14 |
| | S.E. | (5.2) | (7.6) | (4.8) | (-) |

Note: This breakdown is based on the first postsecondary institution named in response to question 9C of the Student Questionnaire. N is the number of students; n is the number of secondary schools.

[a]This category includes all the Ontario universities that were named (excluding Ryerson) plus all out-of-province universities.

[b]This category includes all the Ontario Colleges of Applied Arts and Technology that were named.

[c]This category includes any teacher training institution, college of art, institute of technology (including Ryerson), institution for religious training, military college, business college, mining school, hospital training program or any other training program that was named, whether located in the Province of Ontario or out of it.

TABLE 3.49

Destinations of Students in the SSHGD-OTHER and SSGD-OTHER Groups (Estimated Percentage of Each Group in the Population)

| Group | | Destination: Secondary School | Work | Other[a] | No Response |
|---|---|---|---|---|---|
| SSHGD-OTHER | % | 13 | 69 | 15 | 2 |
| (N=66; n=13) | S.E. | (4.6) | (7.1) | (5.7) | (-) |
| SSGD-OTHER | % | - | 85 | 12 | 3 |
| (N=200; n=14) | S.E. | (-) | (5.2) | (5.3) | (-) |

[a]This category includes students who were planning to get married or travel or who had no fixed plans.

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.50

Plans for Future Attendance at a Postsecondary Institution
(Estimated Percentage of Each Group in the Population)

| Group | | Plan to Attend Before the End of 1979 | Do Not Plan to Attend Before the End of 1979 | No Response |
|---|---|---|---|---|
| SSHGD-OTHER[a] | % | 14 | 1 | - |
| (N=66; n=13) | S.E. | (5.0) | (1.3) | (-) |
| SSGD-SEC | % | 88 | 9 | 3 |
| (N=207; n=14) | S.E. | (2.4) | (2.1) | (-) |

[a]The number of students who indicated they would be returning to secondary school for 1976-77 was 10. The percentages are based on the total N for the group; n is the number of secondary schools.

TABLE 3.51

Sex Distribution
(Estimated Percentage of Each Group in the Population)

| Group | | Male | Female | No Response |
|---|---|---|---|---|
| SSHGD-POSTSEC | % | 46 | 53 | 1 |
| (N=472; n=14) | S.E. | (3.1) | (3.3) | (-) |
| SSHGD-OTHER | % | 48 | 52 | - |
| (N=66; n=13) | S.E. | (8.9) | (8.9) | (-) |
| SSGD-SEC | % | 45 | 55 | - |
| (N=207; n=14) | S.E. | (3.6) | (3.6) | (-) |
| SSGD-POSTSEC | % | 47 | 53 | - |
| (N=104; n=14) | S.E. | (6.4) | (6.4) | (-) |
| SSGD-OTHER | % | 62 | 36 | 3 |
| (N=200; n=14) | S.E. | (5.0) | (4.6) | (-) |

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.52

Age Distribution
(Estimated Percentiles of the
Distribution for Each Group in the Population)

| Group | | Percentile | | | | | Percentage of Non-Respondents |
|---|---|---|---|---|---|---|---|
| | | 10th | 25th | 50th | 75th | 90th | |
| SSHGD-POSTSEC | % | 17.9 | 18.4 | 18.5 | 19 | 19.3 | 1 |
| (N=472; n=14) | S.E. | (0.06) | (0.02) | (0.04) | (0.08) | (0.06) | (-) |
| SSHGD-OTHER | % | 18 | 18.4 | 18.7 | 19.2 | 19.3 | 2 |
| (N=66; n=13) | S.E. | (0.13) | (0.11) | (0.11) | (0.13) | (0.07) | (-) |
| SSGD-SEC | % | 16.9 | 17.4 | 17.7 | 18.1 | 18.3 | 1 |
| (N=207; n=14) | S.E. | (0.11) | (0.5) | (0.5) | (0.5) | (0.5) | (-) |
| SSGD-POSTSEC | % | 17.5 | 17.7 | 18 | 18.3 | 19 | - |
| (N=104; n=14) | S.E. | (0.08) | (0.7) | (0.5) | (0.6) | (0.12) | (-) |
| SSGD-OTHER | % | 17.5 | 17.7 | 18.0 | 18.5 | 19.3 | 5 |
| (N=200; n=14) | S.E. | (0.07) | (0.06) | (0.07) | -(0.11) | (0.16) | (-) |

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.53

Language
(Estimated Percentage of Each Group in the Population)

| Group | | Language Spoken by Parent/Guardian in the Home | | | | Language Spoken by Student Outside Home and School | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | French | English | Other | No Response | French | English | Other | No Response |
| SSHGD-POSTSEC | % | 84 | 13 | 3 | - | 74 | 25 | - | - |
| (N=472; n=14) | S.E. | (3.6) | (3.1) | (1.2) | (-) | (5.6) | (5.6) | (-) | (-) |
| SSHGD-OTHER | % | 73 | 22 | 5 | - | 70 | 30 | - | - |
| (N=66; n=14) | S.E. | (8.4) | (6.2) | (3.9) | (-) | (9.9) | (9.9) | (-) | (-) |
| SSGD-SEC | % | 80 | 19 | 1 | - | 67 | 32 | - | 1 |
| (N=207; n=14) | S.E. | (5.3) | (5.5) | (0.7) | (-) | (8.5) | (8.4) | (-) | (-) |
| SSGD-POSTSEC | % | 83 | 16 | 1 | - | 67 | 32 | - | 1 |
| (N=104; n=14) | S.E. | (4.5) | (4.4) | (0.6) | (-) | (8.3) | (7.5) | (-) | (-) |
| SSGD-OTHER | % | 85 | 15 | - | 1 | 67 | 33 | - | 1 |
| (N=200; n=14) | S.E. | (5.5) | (5.5) | (-) | (-) | (9.1) | (9.3) | (-) | (-) |

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.54

Years of Instruction in Language Other than French
(Estimated Percentage of Each Group in the Population)

| Group | | Years of Instruction 1-3 | 4-6 | 7 or More | No Response (presumed 0 years)[a] |
|---|---|---|---|---|---|
| SSHGD-POSTSEC | % | 8 | 5 | 2 | 89 |
| (N=472; n=14) | S.E. | (2.9) | (1.6) | (0.5) | (-) |
| SSHGD-OTHER | % | 4 | 2 | 11 | 85 |
| (N=66; n=13) | S.E. | (2.7) | (1.5) | (4.7) | (-) |
| SSGD-SEC | % | 7 | 3 | 3 | 86 |
| (N=207; n=14) | S.E. | (2.0) | (1.3) | (1.4) | (-) |
| SSGD-POSTSEC | % | 9 | 5 | 6 | 81 |
| (N=104; n=14) | S.E. | (2.9) | (2.6) | (2.5) | (-) |
| SSGD-OTHER | % | 4 | 9 | 12 | 74 |
| (N=200; n=14) | S.E. | (1.3) | (3.0) | (3.1) | (-) |

Note: N is the number of students; n is the number of secondary schools.

[a]This row sums to 104, a result due to rounding error and to the fact that the percentage of no responses is a simple percentage of the total N whereas the others are within-school percentages averaged over schools.

TABLE 3.55

Country of Birth
(Estimated Percentage of Each Group in the Population)

| Group | | Country Canada | Other | No Response |
|---|---|---|---|---|
| SSHGD-POSTSEC | % | 97 | 3 | - |
| (N=472; n=14) | S.E. | (.16) | (1.6) | (-) |
| SSHGD-OTHER | % | 96 | 4 | - |
| N=66; n=13) | S.E. | (2.4) | (2.4) | (-) |
| SSGD-SEC | % | 98 | 2 | - |
| (N=207; n=14) | S.E. | (1.1) | (1.1) | (-) |
| SSGD-POSTSEC | % | 99 | - | 1 |
| (N=104; n=14) | S.E. | (0.6) | (-) | (-) |
| SSGD-OTHER | % | 99 | - | 1 |
| (N=200; n=14) | S.E. | (0.6) | (-) | (-) |

Note: N is the number of student; n is the number of secondary schools.

TABLE 3.56

Year of Student's Entry into Canada
If Born Outside the Country
(Estimated Percentage of Each Group in the Population)

| Group | | Year of Entry: Prior to 1967 | Between 1967-1971 | Since 1971 |
|---|---|---|---|---|
| SSHGD-POSTSEC | % | 1 | 1 | - |
| (N[a]=16; n=14) | S.E. | (0.8) | (1.0) | (-) |
| SSHGD-OTHER | % | 4 | - | - |
| (N=4; n=13) | S.E. | (2.4) | (-) | (-) |
| SSGD-SEC | % | 2 | - | - |
| (N=4; n=14) | S.E. | (1.1) | (-) | (-) |
| SSGD-POSTSEC | % | - | - | - |
| (N=0; n=14) | S.E. | (-) | (-) | (-) |
| SSGD-OTHER | % | - | - | - |
| (N=1; n=14) | s.E. | (-) | (-) | (-) |

[a]This is the number of students who reported being born outside Canada and who gave a year of entry into the country. The percentages in the table, however, are of the total group (see the N's reported in the previous table).

TABLE 3.57

Country of Birth of Parents/Guardians
(Estimated Percentage of Each Group in the Population)

| Group | | Both Canada | One Canada | Neither Canada | No Response |
|---|---|---|---|---|---|
| SSHGD-POSTSEC | % | 91 | 5 | 4 | - |
| (N=472; n=14) | S.E. | (2.4) | (1.4) | (1.7) | (-) |
| SSHGD-OTHER | % | 87 | 3 | 13 | - |
| (N=66; n=13) | S.E. | (5.2) | (2.0) | (5.3) | (-) |
| SSGD-SEC | % | 92 | 3 | 4 | 1 |
| (N=207; n=14) | S.E. | (2.7) | (1.3) | (1.7) | (-) |
| SSGD-POSTSEC | % | 96 | 2 | 2 | - |
| (N=104; n=14) | S.E. | (1.8) | (1.6) | (1.1) | (-) |
| SSGD-OTHER | % | 97 | 1 | 1 | 1 |
| (N=200; n=14) | S.E. | (1.0) | (0.7) | (0.7) | (-) |

Note: If a student responded for more than one of natural father (mother), adoptive father (mother) and male (female) guardian, the response for natural father (mother) was used if there was one, otherwise the response for adoptive father (mother) was used.

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.58

Education of Parents/Guardians
(Estimated Percentage of Each Group in the Population)

| Group | Parent/ Guardian | | Level Attained[a] 1 | 2 | 3 | 4 | 5 | 6 | 7 | No Response |
|---|---|---|---|---|---|---|---|---|---|---|
| SSHGD-POSTSEC (N=472; n=14) | Male | % | 6 | 21 | 24 | 16 | 10 | 4 | 19 | - |
| | | S.E. | (1.3) | (4.0) | (3.0) | (2.7) | (2.2) | (0.9) | (3.9) | (-) |
| | Female | % | 5 | 13 | 26 | 14 | 23 | 3 | 16 | - |
| | | S.E. | (1.0) | (2.5) | (3.1) | (2.4) | (3.8) | (1.0) | (2.0) | (-) |
| SSHGD-OTHER (N=66; n=13) | Male | % | 6 | 27 | 17 | 11 | 14 | 4 | 21 | - |
| | | S.E. | (4.0) | (7.4) | (5.0) | (4.3) | (4.3) | (2.2) | (7.0) | (-) |
| | Female | % | 11 | 9 | 21 | 12 | 25 | 5 | 18 | - |
| | | S.E. | (7.7) | (4.5) | (7.4) | (4.7) | (7.5) | (2.9) | (6.3) | (-) |
| SSGD-SEC (N=207; n=14) | Male | % | 9 | 24 | 19 | 16 | 15 | 3 | 13 | - |
| | | S.E. | (2.1) | (5.2) | (3.1) | (3.0) | (3.0) | (1.3) | (3.2) | (-) |
| | Female | % | 7 | 14 | 24 | 16 | 20 | 3 | 16 | - |
| | | S.E. | (1.7) | (3.3) | (4.2) | (2.7) | (3.2) | (1.3) | (2.6) | (-) |
| SSGD-POSTSEC (N=104; n=14) | Male | % | 15 | 31 | 26 | 14 | 1 | - | 13 | 1 |
| | | S.E. | (4.5) | (4.1) | (3.4) | (3.0) | (0.6) | (-) | (4.2) | (-) |
| | Female | % | 14 | 19 | 23 | 21 | 8 | 2 | 12 | 1 |
| | | S.E. | (3.1) | (4.6) | (3.0) | (3.9) | (2.7) | (1.1) | (3.6) | (-) |

TABLE 3.58 (continued)

| Group | Parent/ Guardian | | Level Attained[a] 1 | 2 | 3 | 4 | 5 | 6 | 7 | No Response |
|---|---|---|---|---|---|---|---|---|---|---|
| SSGD-OTHER (N=200; n=14) | Male | % | 17 | 40 | 21 | 13 | 3 | 2 | 3 | 1 |
| | | S.E. | (5.2) | (6.3) | (3.3) | (3.9) | (1.2) | (1.8) | (1.0) | (-) |
| | Female | % | 13 | 20 | 36 | 16 | 9 | - | 4 | 2 |
| | | S.E. | (3.0) | (3.4) | (3.9) | (4.4) | (2.3) | (-) | (1.3) | (-) |

Note: If a student responded for more than one of natural father (mother), adoptive father (mother) and male (female) guardian, the response for the natural father (mother) was used if there was one, otherwise the response for adoptive father (mother) was used.

[a]Codes:
1. Unknown.
2. Did not complete elementary school.
3. Completed elementary school, but did not continue to secondary school.
4. Attended secondary school, but did not graduate.
5. Graduated from secondary school, but did not continue to a postsecondary educational institution.
6. Attended a postsecondary institution, but did not graduate.
7. Graduated from a postsecondary educational institution.

TABLE 3.59

Level of Occupation of Parent/Guardians
(Estimated Percentage of Each Group in the Population)

| Group | Parent/ Guardian | | Level of Occupation on Blishen Scale[a] 2 | 3 | 4 | 5 | 6 | 7 | Student | Home-maker | No Response |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SSHGD-POSTSEC | Male | % | 17 | 28 | 26 | 10 | 5 | 9 | - | 1 | 5 |
| (N=472; n=14) | | S.E. | (4.1) | (5.5) | (2.9) | (2.6) | (1.5) | (1.7) | (-) | (0.5) | (-) |
| | Female | % | 2 | 6 | 14 | 4 | - | 9 | - | 64 | 2 |
| | | S.E. | (1.0) | (1.6) | (2.6) | (1.4) | (-) | (1.3) | (-) | (2.5) | (-) |
| SSHGD-OTHER | Male | % | 23 | 23 | 19 | 7 | 2 | 11 | - | 8 | 8 |
| (N=66; n=13) | | S.E. | (8.1) | (7.9) | (5.8) | (4.1) | (1.5) | (3.7) | (-) | (4.5) | (-) |
| | Female | % | - | 12 | 16 | 1 | - | 3 | - | 62 | 6 |
| | | S.E. | (-) | (4.1) | (5.7) | (0.7) | (-) | (1.9) | (-) | (5.3) | (-) |
| SSGD-SEC | Male | % | 16 | 26 | 23 | 14 | 5 | 6 | - | 3 | 7 |
| (N=207; n=14) | S.E. | (3.4) | (4.3) | (1.7) | (2.9) | (1.2) | (-) | (2.3) | (1.2) | (-) | |
| | Female | % | 4 | 8 | 15 | 8 | - | 10 | - | 52 | 3 |
| | | S.E. | (1.4) | (2.1) | (3.0) | (2.5) | (-) | (2.9) | (-) | (3.8) | (-) |
| SSGD-POSTSEC | Male | % | 23 | 21 | 18 | 15 | 4 | 6 | 1 | 3 | 12 |
| (N=104; n=14) | | S.E. | (5.7) | (4.4) | (3.9) | (4.7) | (2.0) | (2.3) | (0.6) | (2.0) | (-) |
| | Female | % | 2 | 12 | 19 | 3 | - | 6 | - | 55 | 4 |
| | | S.E. | (1.1) | (3.7) | (5.6) | (1.8) | (-) | (3.7) | (-) | (4.6) | (-) |

TABLE 3.59 (continued)

| Group | Parent/ Guardian | | Level of Occupation on Blishen Scale[a] 2 | 3 | 4 | 5 | 6 | 7 | Student | Home-maker | No Response |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SSGD-OTHER (N=200; n=14) | Male | % | 23 | 40 | 17 | 4 | - | 1 | - | 5 | 10 |
| | | S.E. | (5.1) | (6.7) | (5.3) | (1.4) | (-) | (1.2) | (-) | (2.5) | (-) |
| | Female | % | 2 | 13 | 11 | 3 | - | 2 | - | 66 | 4 |
| | | S.E. | (0.8) | (2.8) | (3.2) | (1.3) | (-) | (1.0) | (-) | (5.4) | (-) |

Note: If a student responded for more than one of natural father (mother), adoptive father (mother) and natural father (mother), the response for male (female) guardian was used if there was one, otherwise the response for adoptive father (mother) was used.

[a] If an occupation was given, the first digit of the scale value assigned that occupation by Blishen (1967) was recorded. The higher the level an occupation is assigned on the scale, the higher the socio-economic status of the occupation.

TABLE 3.60

Effect of Availability/Unavailability of French Language Programs on Plans for Postsecondary Education (Estimated Percentage of Each Group in the Population)

| Group | | Category of Response[a] 1 | 2 | 3 | 4 | 5 | No Response |
|---|---|---|---|---|---|---|---|
| SSHGD-POSTSEC | % | 57 | - | 20 | 3 | 20 | 1 |
| (N=472; n=14) | S.E. | (4.7) | - | (2.6) | (1.1) | (2.8) | (-) |
| SSHGD-OTHER | % | 61 | 23 | 10 | 1 | 3 | 2 |
| (N=66; n=13) | S.E. | (8.8) | (6.1) | (4.2) | (0.7) | (2.6) | (-) |
| SSGD-SEC | % | 46 | 3 | 22 | 4 | 22 | 3 |
| (N=207; n=14) | S.E. | (3.4) | (1.2) | (4.1) | (1.2) | (4.4) | (-) |
| SSGD-POSTSEC | % | 57 | 2 | 22 | 2 | 17 | - |
| (N=104; n=14) | S.E. | (5.8) | (1.2) | (6.6) | (1.3) | (4.0) | (-) |
| SSGD-OTHER | % | 69 | 14 | 7 | 1 | 2 | 8 |
| (N=200; n=14) | S.E. | (5.7) | (3.9) | (2.6) | (0.6) | (0.8) | (-) |

Note: N is the number of students; n is the number of secondary schools.

[a]Students responded to the following question: Suppose that in Ontario all postsecondary educational programs now available in English were also available in French. In what way if any would this affect your present plans for postsecondary education?

1. There would be no change in my plans.

2. I do not now plan to pursue postsecondary education. I would do so if an appropriate course in French were available.

3. I now plan to pursue postsecondary education in English. I would pursue the <u>same</u> course in French if it were available.

4. I now plan to pursue postsecondary education in English. I would pursue a <u>different</u> course in French if it were available.

5. I now plan to pursue postsecondary education in French. I would pursue a <u>different</u> course in French if it were available.

TABLE 3.61

Percentage of Students in Each SSHGD Group
Who had Accumulated a Specified Number
of Credits or More by June 1976

| Type of Credit/Number of Credits | | SSHGD-POSTSEC (N=402; n=12) | SSHGD-OTHER (N=55; n=11) | ABSENTEES (N=199; n=12) |
|---|---|---|---|---|
| 1. Total | | | | |
| 33 | % | 87 | 65 | 72 |
| | S.E. | (5.3) | (10.5) | (7.1) |
| 34 | % | 81 | 51 | 64 |
| | S.E. | (5.2) | (11.4) | (7.7) |
| 35 | % | 70 | 41 | 51 |
| | S.E. | (4.7) | (10.5) | (6.9) |
| 37 | % | 27 | 16 | 18 |
| | S.E. | (4.1) | (8.9) | (4.8) |
| 39 | % | 3 | 4 | 2 |
| | S.E. | (0.8) | (4.5) | (0.9) |
| 2. Advanced | | | | |
| 16 | % | 90 | 72 | 83 |
| | S.E. | (3.1) | (8.5) | (4.8) |
| 20 | % | 82 | 56 | 73 |
| | S.E. | (4.2) | (8.5) | (6.7) |
| 24 | % | 59 | 28 | 50 |
| | S.E. | (3.9) | (9.1) | (7.6) |
| 28 | % | 18 | 7 | 12 |
| | S.E. | (3.6) | (4.7) | (3.3) |
| 32 | % | 2 | - | 1 |
| | S.E. | (0.7) | (-) | (0.7) |

TABLE 3.61 (continued)

| Type of Credit/Number of Credits | | SSHGD-POSTSEC (N=402; n=12) | SSHGD-OTHER (N=55; n=11) | ABSENTEES (N=199; n=12) |
|---|---|---|---|---|
| 3. Français | | | | |
| 4 | % | 92 | 92 | 81 |
| | S.E. | (1.9) | (3.9) | (5.1) |
| 5 | % | 66 | 70 | 53 |
| | S.E. | (4.8) | (9.1) | (6.1) |
| 6 | % | 19 | 18 | 17 |
| | S.E. | (3.4) | (9.4) | (4.7) |
| 7 | % | 2 | 2 | - |
| | S.E. | (0.9) | (1.8) | (-) |
| 4. Mathematics | | | | |
| 3 | % | 91 | 83 | 83 |
| | S.E. | (1.9) | (4.6) | (4.9) |
| 4 | % | 82 | 76 | 72 |
| | S.E. | (3.2) | (5.8) | (4.1) |
| 5 | % | 61 | 46 | 48 |
| | S.E. | (3.2) | (9.9) | (5.4) |
| 6 | % | 40 | 14 | 34 |
| | S.E. | (2.5) | (8.9) | (4.7) |
| 7 | % | 18 | 5 | 12 |
| | S.E. | (2.7) | (4.5) | (3.0) |
| 8 | % | 2 | - | 2 |
| | S.E. | (1.1) | (-) | (1.4) |

TABLE 3.61 (continued)

| Type of Credit/Number of Credits | | SSHGD-POSTSEC (N=402; n=12) | SSHGD-OTHER (N=55; n=11) | ABSENTEES (N=199; n=12) |
|---|---|---|---|---|
| 5. Traditional Academic | | | | |
| 18 | % | 94 | 81 | 86 |
| | S.E. | (2.3) | (6.4) | (4.5) |
| 22 | % | 85 | 56 | 77 |
| | S.E. | (3.6) | (10.3) | (5.6) |
| 26 | % | 47 | 18 | 35 |
| | S.E. | (4.5) | (6.8) | (4.6) |
| 30 | % | 10 | 4 | 3 |
| | S.E. | (2.8) | (4.5) | (1.6) |

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.62

Percentage of Students in Each SSHGD Group Who Were Taking a Specified Number of Grade 13 Courses or More During 1975-76

| Type of Course/ Number of Courses | | SSHGD-POSTSEC (N=402; N=12) | SSHGD-OTHER (N=55; N=11) | ABSENTEES (N=199; N=12) |
|---|---|---|---|---|
| 1. Total | | | | |
| 4 | % | 95 | 85 | 83 |
| | S.E. | (1.9) | (5.8) | (4.5) |
| 5 | % | 91 | 74 | 77 |
| | S.E. | (3.0) | (8.5) | (4.6) |
| 6 | % | 79 | 61 | 62 |
| | S.E. | (4.6) | (9.9) | (6.3) |
| 7 | % | 16 | 13 | 12 |
| | S.E. | (4.5) | (5.4) | (3.5) |
| 8 | % | 3 | - | 3 |
| | S.E. | (1.2) | (-) | (1.7) |
| 2. Languages | | | | |
| 1 | % | 93 | 91 | 79 |
| | S.E. | (2.2) | (5.5) | (4.9) |
| 2 | % | 64 | 70 | 53 |
| | S.E. | (3.1) | (7.2) | (7.0) |
| 3 | % | 23 | 33 | 23 |
| | S.E. | (3.2) | (9.8) | (4.8) |
| 4 | % | 6 | 19 | 9 |
| | S.E. | (1.9) | (8.8) | (2.1) |

TABLE 3.62 (continued)

| Type of Course/ Number of Courses | | SSHGD-POSTSEC (N=402; N=12) | SSHGD-OTHER (N=55; N=11) | ABSENTEES (N=199; N=12) |
|---|---|---|---|---|
| 3. History/Geography/Social Science | | | | |
| 1 | % | 56 | 54 | 56 |
| | S.E. | (5.1) | (9.6) | (5.0) |
| 2 | % | 21 | 25 | 23 |
| | S.E. | (4.1) | (8.0) | (5.8) |
| 3 | % | 3 | 4 | 3 |
| | S.E. | (1.5) | (3.2) | (1.6) |
| 4. Mathematics/Science | | | | |
| 1 | % | 73 | 63 | 59 |
| | S.E. | (6.2) | (7.6) | (6.8) |
| 2 | % | 46 | 15 | 33 |
| | S.E. | (5.3) | (5.1) | (6.6) |
| 3 | % | 22 | 7 | 15 |
| | S.E. | (2.9) | (3.3) | (4.1) |
| 4 | % | 7 | 1 | 4 |
| | S.E. | (1.7) | (0.8) | (1.7) |

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.63

Percentage of Students in Each SSGD Group Who had Accumulated a Specified Number of Credits or More by June 1976

| Type of Credit/ Number of Credits | | SSGD- SEC (N=207; n=14) | SSGD- POSTSEC (N=103; n=14) | SSGD- OTHER (N=199; n=14) | ABSENTEES (N=197; n=14) |
|---|---|---|---|---|---|
| 1. Total | | | | | |
| 27 | % | 89 | 92 | 89 | 80 |
| | S.E. | (3.2) | (2.6) | (2.8) | (3.7) |
| 28 | % | 82 | 78 | 64 | 56 |
| | S.E. | (4.7) | (4.4) | (4.6) | (4.9) |
| 29 | % | 66 | 62 | 40 | 43 |
| | S.E. | (5.7) | (6.8) | (5.7)) | (6.0) |
| 31 | % | 20 | 13 | 8 | 7 |
| | S.E. | (4.5) | (3.5) | (2.1) | (2.0) |
| 33 | % | 1 | - | - | - |
| | S.E. | (0.8) | (-) | (-) | (-) |

TABLE 3.63 (continued)

| Type of Credit/ Number of Credits | | SSGD- SEC (N=207; n=14) | SSGD- POSTSEC (N=103; n=14) | SSGD- OTHER (N=199; n=14) | ABSENTEES (N=197; n=14) |
|---|---|---|---|---|---|
| 2. Advanced | | | | | |
| 1 | % | 95 | 89 | 84 | 83 |
| | S.E. | (2.4) | (3.8) | (3.2) | (4.2) |
| 5 | % | 89 | 78 | 58 | 63 |
| | S.E. | (3.4) | (6.1) | (7.7) | (5.0) |
| 10 | % | 85 | 64 | 36 | 45 |
| | S.E. | (3.5) | (6.6) | (6.3) | (5.1) |
| 15 | % | 70 | 45 | 14 | 37 |
| | S.E. | (4.5) | (5.6) | (3.1) | (3.3) |
| 20 | % | 37 | 20 | 1 | 10 |
| | S.E. | (3.3) | (7.1) | (0.8) | (2.7) |
| 24 | % | 2 | 1 | - | - |
| | S.E. | (0.8) | (1.2) | (-) | (-) |

TABLE 3.63 (continued)

| Type of Credit/ Number of Credits | | SSGD- SEC (N=207; n=14) | SSGD- POSTSEC (N=103; n=14) | SSGD- OTHER (N=199; n=14) | ABSENTEES (N=197; n=14) |
|---|---|---|---|---|---|
| 3. Français | | | | | |
| 3 | % | 94 | 95 | 94 | 86 |
| | S.E. | (2.0) | (1.9) | (2.3) | (4.0) |
| 4 | % | 87 | 89 | 87 | 71 |
| | S.E. | (2.9) | (2.6) | (3.4) | (5.8) |
| 5 | % | 2 | 3 | 3 | 3 |
| | S.E. | (1.2) | (2.1) | (1.2) | (3.4) |
| 4. Mathematics | | | | | |
| 3 | % | 87 | 88 | 71 | 70 |
| | S.E. | (3.5) | (3.2) | (5.5) | (4.8) |
| 4 | % | 71 | 69 | 47 | 52 |
| | S.E. | (5.5) | (4.4) | (6.3) | (4.4) |
| 5 | % | 10 | 9 | 6 | 8 |
| | S.E. | (4.6) | (4.3) | (3.3) | (3.2) |
| 6 | % | 1 | 4 | 1 | 1 |
| | S.E. | (1.1) | (3.6) | (1.4) | (0.9) |

TABLE 3.63 (continued)

| Type of Credit/ Number of Credits | | SSGD-SEC (N=207; n=14) | SSGD-POSTSEC (N=103; n=14) | SSGD-OTHER (N=199; n=14) | ABSENTEES (N=197; n=14) |
|---|---|---|---|---|---|
| 5. Traditional Academic | | | | | |
| 10 | % | 97 | 98 | 97 | 89 |
| | S.E. | (1.5) | (1.6) | (1.5) | (3.2) |
| 15 | % | 89 | 87 | 71 | 70 |
| | S.E. | (2.5) | (3.8) | (6.3) | (3.1) |
| 20 | % | 51 | 28 | 8 | 19 |
| | S.E. | (3.7) | (6.5) | (2.8) | (2.9) |
| 25 | % | 5 | 2 | - | 1 |
| | S.E. | (1.7) | (1.8) | (-) | (0.7) |

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.64

Percentage of Students in Each SSGD Group
Who Were Taking a Specified Number
of Courses or More During 1975-76

| Type of Course/ Number of Courses | | SSGD-SEC (N=207; n=14) | SSGD-POSTSEC (N=103; n=14) | SSGD-OTHER (N=199; n=14) | ABSENTEES (N=196; n=14) |
|---|---|---|---|---|---|
| 1. Total | | | | | |
| 3 | % | 94 | 94 | 91 | 78 |
| | S.E. | (1.9) | (2.7) | (2.9) | (5.0) |
| 4 | % | 89 | 86 | 79 | 68 |
| | S.E. | (2.7) | (4.6) | (5.8) | (7.2) |
| 5 | % | 71 | 69 | 67 | 50 |
| | S.E. | (5.5) | (8.4) | (7.5) | (7.8) |
| 6 | % | 42 | 45 | 33 | 32 |
| | S.E. | (8.0) | (6.0) | (6.4) | (6.8) |
| 7 | % | 23 | 15 | 12 | 10 |
| | S.E. | (5.8) | (5.2) | (4.2) | (3.2) |
| 8 | % | 4 | 5 | 4 | 2 |
| | S.E. | (2.1) | (2.9) | (1.5) | (1.6) |

TABLE 3.64 (continued)

| Type of Course/ Number of Courses | | SSGD- SEC (N=207; n=14) | SSGD- POSTSEC (N=103; n=14) | SSGD- OTHER (N=199; n=14) | ABSENTEES (N=196; n=14) |
|---|---|---|---|---|---|
| 2. Languages | | | | | |
| 1 | % | 95 | 99 | 93 | 87 |
| | S.E. | (1.6) | (0.9) | (3.1) | (4.1) |
| 2 | % | 81 | 81 | 72 | 63 |
| | S.E. | (7.4) | (6.9) | (5.3) | (7.7) |
| 3 | % | 10 | 4 | 2 | 5 |
| | S.E. | (3.5) | (3.6) | (0.9) | (3.9) |
| 3. History/Geography/Social Science | | | | | |
| 1 | % | 33 | 23 | 19 | 21 |
| | S.E. | (5.3) | (5.6) | (4.7) | (4.4) |
| 2 | % | 3 | 3 | 1 | 1 |
| | S.E. | (1.1) | (1.4) | (0.7) | (1.0) |

TABLE 3.64 (continued)

| Type of Course/ Number of Courses | | SSGD- SEC (N=207; n=14) | SSGD- POSTSEC (N=103; n=14) | SSGD- OTHER (N=199; n=14) | ABSENTEES (N=196; n=14) |
|---|---|---|---|---|---|
| 4. Mathematics/Science | | | | | |
| 1 | % | 83 | 81 | 59 | 59 |
| | S.E. | (4.2) | (6.1) | (7.1) | (5.2) |
| 2 | % | 55 | 31 | 15 | 21 |
| | S.E. | (5.8) | (6.0) | (4.0) | (4.1) |
| 3 | % | 12 | 7 | 2 | 5 |
| | S.E. | (4.8) | (4.2) | (1.0) | (2.2) |

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.65

Test de compréhension en lecture et de connaissance de la langue (français) --Reading Comprehension Part (On a Scale from -2.5 to 14)

| Group | | Percentile | | | | |
|---|---|---|---|---|---|---|
| | | 10th | 25th | 50th | 75th | 90th |
| SSHGD-POSTSEC | | 3.5 | 5.2 | 7 | 8.8 | 10.6 |
| (N=476; n=14) | S.E. | (0.3) | (0.3) | (0.3) | (0.3) | (0.3) |
| SSHGD-OTHER | | 2.5 | 4.5 | 6.4 | 8.3 | 10 |
| (N=65; n=13) | S.E. | (0.7) | (0.7) | (0.7) | (0.7) | (0.7) |
| SSGD-SEC | | 2.6 | 4.4 | 6.2 | 8.1 | 9.9 |
| (N=212; n=14) | S.E. | (0.3) | (0.3) | (0.2) | (0.2) | (0.3) |
| SSGD-POSTSEC | | 1.6 | 3.4 | 5.1 | 6.9 | 8.6 |
| (N=104; n=14) | S.E. | (0.5) | (0.4) | (0.4) | (0.4) | (0.5) |
| SSGD-OTHER | | 0.3 | 2 | 3.8 | 5.6 | 7.5 |
| (N=200; n=14) | S.E. | (0.5) | (0.3) | (0.3) | (0.3) | (0.4) |

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.66

Test de compréhension en lecture et de connaissance de la langue (français) - First Language Achievement Part
(On a Scale from -2.75 to 11)

| Group | | Percentile 10th | 25th | 50th | 75th | 90th |
|---|---|---|---|---|---|---|
| SSHGD-POSTSEC | | 0 | 1.4 | 3 | 4.7 | 6.5 |
| (N=476; n=14) | S.E. | (0.2) | (0.2) | (0.2) | (0.2) | (0.3) |
| SSHGD-OTHER | | -0.6 | 0.5 | 2.0 | 4 | 6.3 |
| (N=65; n=13) | S.E. | (0.5) | (0.5) | (0.6) | (0.7) | (0.9) |
| SSGD-SEC | | -0.7 | 0.9 | 2.6 | 4.4 | 6.2 |
| (N=212; n=14) | S.E. | (0.5) | (0.3) | (0.3) | (0.3) | (0.4) |
| SSGD-POSTSEC | | -1.1 | 0 | 1.4 | 3 | 4.8 |
| (N=104; n=14) | S.E. | (0.3) | (0.3) | (0.3) | (0.3) | (0.4) |
| SSGD-OTHER | | -1.3 | -0.1 | 1.2 | 2.7 | 4.2 |
| (N=104; n=14) | S.E. | (0.3) | (0.2) | (0.2) | (0.2) | (0.3) |

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.67

Test de compréhension en lecture et de connaissance de la langue (français)
Second Language Achievement Part
(On a Scale from -2.25 to 9)

| Group | | Percentile 10th | 25th | 50th | 75th | 90th |
|---|---|---|---|---|---|---|
| SSHGD-POSTSEC | | 0.6 | 2.4 | 4.2 | 6 | 7.7 |
| (N=476; n=14) | S.E. | (0.3) | (0.3) | (0.3) | (0.3) | (0.3) |
| SSHGD-OTHER | | -0.2 | 0.6 | 2.2 | 4.5 | 7.6 |
| (N=65; n=13) | S.E. | (0.4) | (0.4) | (0.6) | (0.7) | (1.2) |
| SSGD-SEC | | -0.3 | 1.4 | 3.1 | 4.9 | 6.6 |
| (N=212; n=14) | S.E. | (0.3) | (0.3) | (0.3) | (0.3) | (0.3) |
| SSGD-POSTSEC | | -0.6 | 0.3 | 1.5 | 3.2 | 5.2 |
| (N=104; n=14) | S.E. | (0.2) | (0.2) | (0.3) | (0.4) | (0.6) |
| SSGD-OTHER | | -1.0 | 0.1 | 1.3 | 2.6 | 4 |
| (N=200; n=14) | S.E. | (0.3) | (0.2) | (0.3) | (0.3) | (0.3) |

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.68

Test de compréhension en lecture et de connaissance de la langue (français)
Total Test
(On a Scale from -8.5 to 34)

| Group | | Percentile | | | | |
|---|---|---|---|---|---|---|
| | | $10^{th}$ | $25^{th}$ | $50^{th}$ | $75^{th}$ | $90^{th}$ |
| SSHGD-POSTSEC | | 6.5 | 10.3 | 14.2 | 18.2 | 22.4 |
| (N=476; n=14) | S.E. | (0.6) | (0.6) | (0.7) | (0.8) | (0.9) |
| SSHGD-OTHER | | 3.4 | 6.5 | 10.6 | 15.7 | 21.9 |
| (N=65; n=13) | S.E. | (1.3) | (1.3) | (1.5) | (1.8) | (2.5) |
| SSGD-SEC | | 4.7 | 7.9 | 11.7 | 16.0 | 20.9 |
| (N=212; n=14) | S.E. | (0.8) | (0.7) | (0.7) | (0.7) | (0.8) |
| SSGD-POSTSEC | | 1.9 | 4.3 | 7.7 | 12.0 | 17.4 |
| (N=104; n=14) | S.E. | (0.8) | (0.8) | (0.9) | (1.1) | (1.4) |
| SSGD-OTHER | | 0.7 | 3.4 | 6.4 | 9.5 | 12.8 |
| (N=200; n=14) | S.E. | (0.6) | (0.4) | (0.4) | (0.5) | (0.7) |

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.69

Test de composition écrite
(On a Scale from 1 to 10)

| Group | | $10^{th}$ | $25^{th}$ | $50^{th}$ | $75^{th}$ | $90^{th}$ |
|---|---|---|---|---|---|---|
| SSHGD-POSTSEC | | 5 | 5.8 | 6.7 | 7.6 | 8.4 |
| (N=186; n=14) | S.E. | (0.2) | (0.2) | (0.2) | (0.2) | (0.2) |
| SSHGD-OTHER | | 4.2 | 5.1 | 6.1 | 7 | 8 |
| (N=28; n=13) | S.E. | (0.5) | (0.4) | (0.4) | (0.4) | (0.5) |
| SSGD-SEC | | 4.4 | 5.3 | 6.2 | 7.1 | 8 |
| (N=98; n=14) | S.E. | (0.3) | (0.2) | (0.2) | (0.2) | (0.3) |
| SSGD-POSTSEC | | 2.9 | 4 | 5.1 | 6.3 | 7.5 |
| (N=50; n=14) | S.E. | (0.5) | (0.4) | (0.4) | (0.5) | (0.8) |
| SSGD-OTHER | | 3.2 | 4.1 | 5 | 5.8 | 6.7 |
| (N=98; n=14) | S.E. | (0.3) | (0.2) | (0.2) | (0.2) | (0.3) |

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.70

Test d'arithmétique et d'algèbre de base
(On a Scale from -8.75 to 35)

| Group | | Percentile 10th | 25th | 50th | 75th | 90th |
|---|---|---|---|---|---|---|
| SSGD-SEC | | 3.5 | 9.2 | 14.9 | 20.5 | 26.1 |
| (N=112; n=14) | S.E. | (1.5) | (1.3) | (1.4) | (1.4) | (1.8) |
| SSGD-POSTSEC | | 0.3 | 2.9 | 9.3 | 19.5 | 26.6 |
| (N=63; n=14) | S.E. | (1.6) | (1.7) | (2.0) | (2.6) | (2.8) |
| SSGD-OTHER | | -1.9 | -0.5 | 2.8 | 8 | 15.3 |
| (N=116; n=14) | S.E. | (0.6) | (0.9) | (1.2) | (1.6) | (2.3) |

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.71

Test de rendement en mathématiques
(On a Scale from -4.5 to 36)

| Group | | Percentile $10^{th}$ | $25^{th}$ | $50^{th}$ | $75^{th}$ | $90^{th}$ |
|---|---|---|---|---|---|---|
| SSHGD-POSTSEC | | 8.7 | 10.6 | 13.3 | 16.8 | 21.1 |
| (N=133; n=14) | S.E. | (0.8) | (0.7) | (0.7) | (0.7) | (1.0) |
| SSHGD-OTHER[a] | | - | - | - | - | - |
| (N=7; n=7) | S.E. | (-) | (-) | (-) | (-) | (-) |

Note: N is the number of students; n is the number of secondary schools.

[a]Too few students in this group wrote the test for percentiles to be estimated.

TABLE 3.72

Test de connaissance de la langue (anglais)
Reading Comprehension Part
(On a Scale from -6.33 to 19)

| Group | | Percentile | | | | |
|---|---|---|---|---|---|---|
| | | $10^{th}$ | $25^{th}$ | $50^{th}$ | $75^{th}$ | $90^{th}$ |
| SSHGD-POSTSEC | | 8.7 | 11.2 | 13.5 | 15.8 | 17.9 |
| (N=262; n=14) | S.E. | (0.6) | (0.5) | (0.6) | (0.7) | (1.3) |
| SSHGD-OTHER | | 7.8 | 10.8 | 13.2 | 15.0 | 16.3 |
| (N=32; n=11) | S.E. | (1.7) | (1.2) | (1.0) | (0.9) | (0.8) |
| SSGD-SEC | | 5.8 | 8.9 | 11.8 | 14.5 | 17 |
| (N=83; n=14) | S.E. | (0.7) | (0.6) | (0.7) | (0.7) | (0.9) |
| SSGD-POSTSEC | | 4.9 | 9.4 | 13.2 | 16.4 | -[a] |
| (N=30; n=13) | S.E. | (1.7) | (1.4) | (1.4) | (1.6) | (-) |
| SSGD-OTHER | | 3.1 | 5.3 | 7.8 | 10.6 | 13.8 |
| (N=63; n=13) | S.E. | (0.9) | (0.9) | (1.0) | (1.1) | (1.3) |

Note: N is the number of students; n is the number of secondary schools.

[a]Percentile not estimable.

TABLE 3.73

Test de connaissance de la langue (anglais)
Writing Exercise--Summary Score
(On a Scale from 0 to 10)

| Group | | Percentile $10^{th}$ | $25^{th}$ | $50^{th}$ | $75^{th}$ | $90^{th}$ |
|---|---|---|---|---|---|---|
| SSHGD-POSTSEC | | 1.3 | 2.7 | 3.9 | 5.1 | 6.2 |
| (N=260; n=14) | S.E. | (0.3) | (0.3) | (0.3) | (0.3) | (0.4) |
| SSHGD-OTHER | | 0.8 | 1.4 | 2.8 | 4.1 | 5.5 |
| (N=32; n=11) | S.E. | (1.2) | (0.7) | (0.6) | (0.7) | (1.1) |
| SSGD-SEC | | 0.9 | 1.9 | 3.2 | 4.8 | 6.7 |
| (N=82; n=14) | S.E. | (0.3) | (0.3) | (0.4) | (0.4) | (0.5) |
| SSGD-POSTSEC | | 0.6 | 2.1 | 3.3 | 4.3 | 5.2 |
| (N=30; n=13) | S.E. | (0.9) | (0.6) | (0.5) | (0.5) | (0.5) |
| SSGD-OTHER | | 0.3 | 1.2 | 2.2 | 3.2 | 4.4 |
| (N=59; n=13) | S.E. | (0.6) | (0.4) | (0.4) | (0.4) | (0.5) |

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.74

Test de connaissance de la langue (anglais)
Writing Exercise--Commentary Score
(On a Scale from 1 to 10)

| Group | | Percentile 10th | 25th | 50th | 75th | 90th |
|---|---|---|---|---|---|---|
| SSHGD-POSTSEC | | 2.3 | 3.5 | 5.0 | 6.7 | 8.6 |
| (N=260; n=14) | S.E. | (0.4) | (0.3) | (0.4) | (0.5) | (1.1) |
| SSHGD-OTHER | | 2.2 | 3.5 | 4.9 | 6.5 | 8.3 |
| (N=32; n=11) | S.E. | (0.7) | (0.7) | (0.7) | (0.8) | (1.2) |
| SSGD-SEC | | 1.9 | 3.1 | 4.4 | 5.7 | 7.1 |
| (N=82; n=14) | S.E. | (0.4) | (0.3) | (0.3) | (0.4) | (0.4) |
| SSGD-POSTSEC | | 1.4 | 2.2 | 3.2 | 4.5 | 6 |
| (N=30; n=13) | S.E. | (0.7) | (0.5) | (0.5) | (0.5) | (0.7) |
| SSGD-OTHER | | 1.9 | 2.6 | 3.5 | 4.6 | 5.8 |
| (N=59; n=13) | S.E. | (0.3) | (0.3) | (0.4) | (0.4) | (0.5) |

Note: N is the number of students; n is the number of secondary schools.

TABLE 3.75

Test de rendement en physique
(On a Scale from -7.5 to 60)

| Group | | Percentile 10th | 25th | 50th | 75th | 90th |
|---|---|---|---|---|---|---|
| SSHGD-POSTSEC | | 3.6 | 3.7 | 6.6 | 12.2 | 20.6 |
| (N=78; n=14) | S.E. | (0.6) | (0.7) | (0.8) | (1.4) | (3.1) |
| SSHGD-OTHER[a] | | - | - | - | - | - |
| (N=4; n=3) | S.E. | (-) | (-) | (-) | (-) | (-) |

[a]Too few students in this group wrote the test for percentiles to be estimated.

TABLE 3.76

Coefficients of Correlation or Multiple Correlation Between Marks in Selected Courses and Scores in Selected Tests

| Criterion | Predictor[a] | N | n | r |
|---|---|---|---|---|
| SSHGD Course Marks | | | | |
| Français | Set 1 | 151 | 12 | 0.60 |
| English/Anglais | Set 2 | 241 | 12 | 0.50 |
| Mathématiques[b] | MAT | 109 | 12 | 0.62 |
| Physique | PAT | 63 | 12 | 0.52 |
| SSGD Course Marks | | | | |
| Advanced Français | Set 1 | 118 | 14 | 0.66 |
| General Français | Set 1 | 102 | 13 | 0.56 |
| Advanced English/Anglais | Set 2 | 81 | 13 | 0.61 |
| General English/Anglais | Set 2 | 61 | 13 | 0.56 |
| Advanced Mathématiques | TAA | 107 | 13 | 0.70 |
| General Mathématiques | TAA | 51 | 10 | 0.03 |

TABLE 3.76 (continued)

Note: N is the number of students, n the number of schools, and r the coefficient of correlation.

[a]The code to the predictors is as follows:

Set 1--the three subtests (parts) of the _Test de compréhension en lecture et de connaissance de la langue (français)_ and the _composition écrite_

Set 2--the three scores on the _Test de connaissance de la langue (anglais)_

MAT--_Test de rendement en mathématiques_

PAT--_Test de rendement en physique_

TAA--_Test d'arithmétique et d'algèbre de base_

[b]This code was the mean of marks in the calculus course and the relations and functions course.

TABLE 3.77

Coefficients of Correlation Between the Observed Mean Course Mark and the Predicted Mean Course Mark

| Courses | Number of Schools: Untrimmed | Number of Schools: Trimmed[a] | Correlation Coefficient: Untrimmed | Correlation Coefficient: Trimmed[a] |
|---|---|---|---|---|
| SSHGD Courses | | | | |
| Français | 12 | 12 | 0.33 | 0.33 |
| English/Anglais | 12 | 12 | 0.19 | 0.19 |
| Mathematics | 12 | 12 | 0.26 | 0.26 |
| Physics | 12 | 8 | 0.82 | 0.38 |
| SSGD Courses | | | | |
| Advanced Français | 14 | 14 | 0.60 | 0.60 |
| General Français | 13 | 11 | 0.01 | 0.38 |
| Advanced English/ Anglais | 13 | 11 | 0.04 | 0.23 |
| General English/ Anglais | 13 | 8 | -0.06 | 0.25 |
| Advanced Mathematics | 13 | 13 | 0.10 | 0.10 |

[a]All schools for which the means were based on fewer than four observations were excluded from the computation of the trimmed correlation coefficients.

TABLE 3.78

Coefficients of Correlation Between Predicted Mean Course Marks and the Difference Between Observed and Predicted Mean Course Marks

| Courses | Number of Schools | | Correlation Coefficient | |
|---|---|---|---|---|
| | Untrimmed | Trimmed[a] | Untrimmed | Trimmed[a] |
| SSHGD Courses | | | | |
| Français | 12 | 12 | -0.27 | -0.27 |
| English/Anglais | 12 | 12 | -0.27 | -0.27 |
| Mathematics | 12 | 12 | -0.50 | -0.50 |
| Physics | 12 | 8 | -0.59 | -0.13 |
| SSGD Courses | | | | |
| Advanced Français | 14 | 14 | -0.33 | -0.33 |
| General Français | 13 | 11 | -0.38 | 0.01 |
| Advanced English/ Anglais | 13 | 11 | -0.67 | -0.62 |
| General English/ Anglais | 13 | 8 | -0.77 | -0.41 |
| Advanced Mathematics | 13 | 13 | -0.64 | -0.64 |

[a]All schools for which the means were based on fewer than four observations were excluded from the computation of the trimmed correlation coefficients.

TABLE 3.79

Coefficients of Intercorrelation among Observed Minus Predicted Mean Marks for SSHGD-Level Courses

| Course | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1. Français | | 24<br>(12) | 12<br>(8) | 09<br>(12) |
| 2. English/Anglais | 24<br>(12) | | -48<br>(8) | 13<br>(12) |
| 3. Mathematics | 09<br>(12) | 11<br>(12) | | -16<br>(8) |
| 4. Physics | 30<br>(12) | 13<br>(12) | -14<br>(12) | |

Note: Correlation coefficients based on the untrimmed sample of schools lie below the diagonal, those for the trimmed sample lie above. Decimal points have been omitted from the coefficients. The number of schools on which a coefficient was based is given below it in parentheses.

TABLE 3.80

Coefficients of Intercorrelation among Observed Minus Predicted Mean Marks for SSHGD-Level Courses

| Course | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 1. Advanced Français | | 09 (11) | 32 (11) | -15 (8) | 02 (13) |
| 2. General Français | 23 (13) | | -10 (8) | 26 (7) | 78 (10) |
| 3. Advanced English/Anglais | 31 (13) | -17 (12) | | -21 (6) | 09 (10) |
| 4. General English/Anglais | -31 (13) | 00 (13) | 27 (12) | | 71 (7) |
| 5. Advanced Mathematics | 02 (13) | 62 (12) | 15 (12) | 43 (12) | |

Note: Correlation coefficients based on the untrimmed sample of schools lie below the diagonal, those for the trimmed sample lie above. Decimal points have been omitted from the coefficients. The number of schools on which a coefficient was based is given below it in parentheses.

TABLE 3.81

Selected Percentile Points of the Distribution of Differences Between Observed and Predicted Mean Marks and the Standard Deviation of the Distribution

| Course | n | 25th | 50th | 75th | N | S.D. |
|---|---|---|---|---|---|---|
| | | Percentiles | | | | |
| SSHGD | | | | | | |
| Français | 12 | -2.0 | 0.2 | 2.7 | 470 | 10.7 |
| English/Anglais | 12 | -2.6 | -0.5 | 4.8 | 460 | 10.0 |
| Mathematics | 12 | -2.8 | 0.1 | 3.9 | 370 | 13.9 |
| Physics | 12 | -3.6 | -0.6 | 2.1 | 191 | 12.9 |
| SSGD | | | | | | |
| Advanced Français | 14 | -2.5 | -0.6 | 2.7 | 337 | 10.8 |
| General Français | 13 | -4.3 | 1.0 | 4.7 | 268 | 10.8 |
| Advanced English/Anglais | 13 | -4.6 | 0.8 | 4.8 | 314 | 10.0 |
| General English/Anglais | 13 | -7.6 | 2.2 | 5.7 | 265 | 10.5 |
| Advanced Mathematics | 13 | -7.8 | 0.6 | 7.9 | 246 | 14.5 |

Note: n was the number of schools in which there were data available for evaluating the differences between observed and predicted mean marks; N was the number of students for whom school marks were obtained.

TABLE 3.82

Frequency Distribution of the Program Areas of Sampled Students for Each University

| University | Program Area[a] 1 | 2 | 3 | 4 | Total Records Received | No Records Received | Target[b] Total |
|---|---|---|---|---|---|---|---|
| 1. Brock | 7 | 10 | 13 | - | 30 | 3 | 33 |
| 2. Carleton | 20 | 19 | 15 | 33 | 87 | 15 | 102 |
| 3. Guelph | 16 | 45 | 66 | 1 | 128 | 9 | 137 |
| 4. Lakehead | 1 | 9 | 7 | 10 | 27 | 2 | 29 |
| 5. Laurentian | 6 | 15 | 6 | 9 | 36 | 4 | 40 |
| 6. McMaster | 21 | 63 | 48 | 15 | 147 | 51 | 198 |
| 7. Ottawa | 29 | 19 | 21 | 3 | 72 | 7 | 79 |
| 8. Toronto | 107 | 136 | 174 | 74 | 491 | 47 | 538 |
| 9. Trent | 2 | 11 | 2 | - | 15 | 26 | 41 |
| 10. Waterloo | 7 | 44 | 104 | 39 | 194 | 14 | 208 |
| 11. Windsor | 15 | 16 | 15 | 33 | 79 | 6 | 85 |
| TOTAL | 231 | 387 | 471 | 217 | 1306 | 184 | 1490 |

[a]Codes for program areas:

1 - Humanities/Arts

2 - Social Sciences

3 - Sciences

4 - Professions

TABLE 3.82 (continued)

[b] The "Target Total" was the number of students per university sampled from the OUAC file. The column "No Records Received" indicates the number of students in the Target Total for which first year records were not provided by the university. For all universities except Trent, these constitute students who had been accepted for admission but who either failed to register or who withdrew from university sometime during the year. Trent includes these types of students too, but in addition it includes students who refused to grant permission for their records to be used in this study.

TABLE 3.83

Percentage Distributions of Students by Sex

| Students with Acceptable Data, Grouped by: | N | Male % | Female % |
|---|---|---|---|
| University | | | |
| Brock | 29 | 48 | 52 |
| Carleton | 87 | 48 | 52 |
| Guelph | 126 | 36 | 63 |
| Lakehead | 26 | 54 | 46 |
| Laurentian | 33 | 48 | 52 |
| McMaster | 145 | 56 | 44 |
| Ottawa | 72 | 44 | 56 |
| Toronto | 489 | 56 | 44 |
| Trent | 15 | 33 | 67 |
| Waterloo | 194 | 68 | 32 |
| Windsor | 74 | 50 | 50 |
| Program | | | |
| Humanities/Arts | 229 | 27 | 73 |
| Social Sciences | 384 | 49 | 51 |
| Sciences | 465 | 65 | 35 |
| Professions | 212 | 65 | 35 |
| Total (over Universities or Programs) | 1290 | 54 | 46 |
| Students with Unacceptable Data for Reason of: | | | |
| No University Records | 184 | 59 | 41 |
| Small Number of Secondary School Credits | 21 | 67 | 33 |

TABLE 3.84

Mean and Standard Deviation of Age Distributions

| Students with Acceptable Data, Grouped by: | N | Mean | S.D. |
|---|---|---|---|
| University | | | |
| Brock | 29 | 19.1 | 0.7 |
| Carleton | 87 | 18.9 | 0.7 |
| Guelph | 126 | 19.0 | 0.8 |
| Lakehead | 26 | 19.2 | 0.8 |
| Laurentian | 33 | 19.2 | 0.4 |
| McMaster | 145 | 19.1 | 0.8 |
| Ottawa | 72 | 19.0 | 1.0 |
| Toronto | 489 | 19.0 | 0.8 |
| Trent | 15 | 19.0 | 0.6 |
| Waterloo | 194 | 19.1 | 0.6 |
| Windsor | 74 | 19.3 | 1.1 |
| Program | | | |
| Humanities/Arts | 229 | 18.9 | 0.7 |
| Social Sciences | 384 | 19.2 | 0.7 |
| Sciences | 465 | 19.0 | 0.9 |
| Professions | 212 | 19.1 | 0.8 |
| Total (over Universities or Programs) | 1290 | 19.1 | 0.8 |
| Students with Unacceptable Data for Reason of: | | | |
| No University Records | 184 | 19.2 | 0.7 |
| Small Number of Secondary School Credits | 21 | 19.9 | 1.5 |

TABLE 3.85

Percentages of Students Born in Canada

| Students with Acceptable Data, Grouped by: | N | % |
|---|---|---|
| University | | |
| Brock | 29 | 90 |
| Carleton | 87 | 92 |
| Guelph | 126 | 97 |
| Lakehead | 26 | 88 |
| Laurentian | 33 | 94 |
| McMaster | 145 | 85 |
| Ottawa | 72 | 88 |
| Toronto | 489 | 80 |
| Trent | 15 | 100 |
| Waterloo | 194 | 90 |
| Windsor | 74 | 80 |
| Program | | |
| Humanities/Arts | 229 | 86 |
| Social Sciences | 384 | 91 |
| Sciences | 465 | 81 |
| Professions | 212 | 86 |
| Total (over Universities or Programs) | 1290 | 86 |
| Students with Unacceptable Data for Reason of: | | |
| No University Records | 184 | 88 |
| Small Number of Secondary School Credits | 21 | 63 |

TABLE 3.86

Percentages of Students Whose Mother Tongue is English, French or Another Language

| Students with Acceptable Data, Grouped by: | N | English % | French % | Other % |
|---|---|---|---|---|
| University | | | | |
| Brock | 29 | 90 | - | 10 |
| Carleton | 87 | 91 | 3 | 6 |
| Guelph | 126 | 96 | - | 4 |
| Lakehead | 26 | 100 | - | - |
| Laurentian | 33 | 76 | 15 | 9 |
| McMaster | 145 | 86 | 1 | 13 |
| Ottawa | 72 | 37 | 52 | 11 |
| Toronto | 489 | 78 | - | 21 |
| Trent | 15 | 100 | - | - |
| Waterloo | 194 | 88 | - | 12 |
| Windsor | 74 | 82 | 4 | 14 |
| Program | | | | |
| Humanities/Arts | 229 | 77 | 8 | 15 |
| Social Sciences | 384 | 86 | 4 | 9 |
| Sciences | 465 | 80 | 2 | 18 |
| Professions | 212 | 84 | 3 | 13 |
| Total (over Universities or Programs) | 1290 | 82 | 4 | 14 |
| Students with Unacceptable Data for Reason of: | | | | |
| No University Records | 184 | 89 | 3 | 8 |
| Small Number of Secondary School Credits | 21 | 67 | - | 33 |

TABLE 3.87

Percentage Distributions of Number of SSHGD Credits in Language Courses

| Students with Acceptable Data, Grouped by: | N | Number of Credits 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|---|
| University | | | | | | | | | |
| Brock | 29 | 3 | 52 | 24 | 17 | - | - | - | 3 |
| Carleton | 87 | 10 | 30 | 34 | 17 | 7 | - | 1 | 2 |
| Guelph | 126 | 12 | 50 | 29 | 6 | 2 | - | - | - |
| Lakehead | 26 | 12 | 31 | 27 | 19 | 8 | - | - | 4 |
| Laurentian | 33 | 9 | 42 | 12 | 18 | 6 | 9 | 3 | - |
| McMaster | 145 | 13 | 38 | 25 | 16 | 4 | 3 | - | 1 |
| Ottawa | 72 | 7 | 22 | 40 | 17 | 11 | - | 1 | 1 |
| Toronto | 489 | 15 | 38 | 26 | 13 | 5 | 2 | - | - |
| Trent | 15 | - | 40 | 53 | 7 | - | - | - | - |
| Waterloo | 194 | 27 | 48 | 19 | 5 | 2 | 1 | - | - |
| Windsor | 74 | 8 | 40 | 20 | 23 | 7 | 1 | - | - |
| Program | | | | | | | | | |
| Humanities/Arts | 229 | 1 | 13 | 31 | 28 | 16 | 7 | 1 | 3 |
| Social Sciences | 384 | 7 | 42 | 31 | 15 | 4 | - | - | - |
| Sciences | 465 | 25 | 48 | 20 | 6 | - | - | - | - |
| Professions | 212 | 18 | 48 | 24 | 7 | 3 | - | - | - |
| Total (over Universities or Programs) | 1290 | 14 | 40 | 26 | 12 | 5 | 1 | - | 1 |

TABLE 3.87 (continued)

| Students with Unacceptable Data for Reason of: | N | Number of Credits 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|---|
| No University Records | 184 | 14 | 40 | 29 | 10 | 5 | 1 | 1 | - |
| Small Number of Secondary School Credits | 21 | 95 | 5 | - | - | - | - | - | - |

TABLE 3.88

Percentage Distribution of Number of SSHGD Credits in History/Geography/Other Social Science Courses

| Students with Acceptable Data, Grouped by: | N | Number of Credits 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|
| **University** | | | | | | | |
| Brock | 29 | 31 | 48 | 17 | 3 | - | - |
| Carleton | 87 | 31 | 25 | 26 | 14 | 3 | - |
| Guelph | 126 | 34 | 40 | 17 | 7 | 1 | - |
| Lakehead | 26 | 42 | 19 | 27 | 12 | - | - |
| Laurentian | 33 | 18 | 21 | 42 | 12 | 6 | - |
| McMaster | 145 | 43 | 25 | 13 | 13 | 6 | 1 |
| Ottawa | 72 | 32 | 22 | 32 | 11 | 3 | - |
| Toronto | 489 | 40 | 27 | 20 | 11 | 2 | - |
| Trent | 15 | - | 20 | 40 | 33 | 7 | - |
| Waterloo | 194 | 45 | 36 | 11 | 6 | 3 | - |
| Windsor | 74 | 30 | 26 | 30 | 12 | 3 | - |
| **Program** | | | | | | | |
| Humanities/Arts | 229 | 20 | 29 | 35 | 13 | 3 | - |
| Social Sciences | 384 | 15 | 26 | 28 | 24 | 7 | - |
| Sciences | 465 | 60 | 31 | 8 | - | - | - |
| Professions | 212 | 47 | 29 | 17 | 5 | 2 | - |
| Total (over Universities or Programs) | 1290 | 38 | 29 | 20 | 10 | 3 | - |
| **Students with Unacceptable Data for Reason of:** | | | | | | | |
| No University Records | 184 | 28 | 28 | 19 | 15 | 9 | 2 |
| Small Number of Secondary School Credits | 21 | 86 | 10 | 5 | - | - | - |

TABLE 3.89

Percentage Distributions of Number of SSHGD Credits in Mathematics/Science Courses

| Students with Acceptable Data, Grouped by: | N | Number of Credits 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|---|
| University | | | | | | | | | | |
| Brock | 29 | 14 | 7 | 3 | 14 | 28 | 24 | 10 | - | - |
| Carleton | 87 | 14 | 11 | 11 | 9 | 18 | 24 | 9 | 2 | - |
| Guelph | 126 | 2 | 10 | 10 | 7 | 25 | 24 | 16 | 6 | - |
| Lakehead | 26 | 4 | - | 15 | 27 | 12 | 12 | 27 | - | 1 |
| Laurentian | 33 | 12 | 12 | 15 | 27 | 6 | 18 | 6 | - | 1 |
| McMaster | 145 | 6 | 12 | 14 | 14 | 10 | 17 | 17 | 8 | 1 |
| Ottawa | 72 | 11 | 15 | 15 | 15 | 11 | 19 | 6 | 3 | 4 |
| Toronto | 489 | 9 | 10 | 13 | 13 | 17 | 23 | 13 | 2 | 1 |
| Trent | 15 | 20 | 20 | 40 | 13 | 7 | - | - | - | - |
| Waterloo | 194 | 2 | 6 | 7 | 7 | 15 | 33 | 26 | 5 | 1 |
| Windsor | 74 | 7 | 19 | 24 | 12 | 15 | 12 | 5 | 1 | 4 |
| Program | | | | | | | | | | |
| Humanities/Arts | 229 | 22 | 28 | 20 | 17 | 7 | 4 | - | - | - |
| Social Sciences | 384 | 9 | 15 | 23 | 18 | 17 | 11 | 5 | 2 | - |
| Sciences | 465 | - | 1 | 3 | 4 | 18 | 38 | 29 | 6 | 1 |
| Professions | 212 | 2 | 4 | 10 | 12 | 20 | 28 | 15 | 4 | 4 |
| Total (over Universities or Programs) | 1290 | 7 | 10 | 13 | 12 | 16 | 22 | 14 | 3 | 1 |

TABLE 3.89 (continued)

| Students with Unacceptable Data for Reason of: | N | Number of Credits 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|---|
| No University Records | 184 | 17 | 14 | 9 | 16 | 17 | 12 | 10 | 4 | 1 |
| Small Number of Secondary School Credits | 21 | 62 | 10 | 14 | 14 | - | - | - | - | - |

TABLE 3.90

Percentage Distributions of Total Number of SSHGD Credits

| Students with Acceptable Data, Grouped by: | N | Number of Credits: 3 or fewer | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| **University** | | | | | | | |
| Brock | 29 | - | - | 3 | 62 | 14 | 21 |
| Carleton | 87 | - | - | 2 | 50 | 19 | 28 |
| Guelph | 126 | - | 2 | 2 | 43 | 21 | 33 |
| Lakehead | 26 | - | - | 4 | 12 | 27 | 58 |
| Laurentian | 33 | - | - | - | 42 | 15 | 42 |
| McMaster | 145 | - | 1 | 1 | 35 | 19 | 45 |
| Ottawa | 72 | - | - | 3 | 47 | 21 | 29 |
| Toronto | 489 | - | 1 | 3 | 57 | 22 | 15 |
| Trent | 15 | - | - | 7 | 87 | 7 | - |
| Waterloo | 194 | - | - | 3 | 42 | 33 | 23 |
| Windsor | 74 | - | 1 | 4 | 43 | 13 | 13 |
| **Program** | | | | | | | |
| Humanities/Arts | 229 | - | 1 | 4 | 57 | 17 | 20 |
| Social Sciences | 384 | - | 1 | 3 | 55 | 17 | 24 |
| Sciences | 465 | - | 1 | 2 | 41 | 29 | 27 |
| Professions | 212 | - | - | 2 | 48 | 25 | 24 |
| Total (over Universities or Programs) | 1290 | - | 1 | 3 | 49 | 23 | 24 |
| **Students with Unacceptable Data for Reason of:** | | | | | | | |
| No University Records | 184 | 4 | 1 | 6 | 47 | 20 | 25 |
| Small Number of Secondary School Credits | 21 | 21 | - | - | - | - | - |

TABLE 3.91

Means and Standard Deviations of Distributions of Average Marks in SSHGD Language Courses

| Students with Acceptable Data, Grouped by: | N | Mean | S.D. |
|---|---|---|---|
| University | | | |
| Brock | 28 | 72.0 | 9.7 |
| Carleton | 78 | 70.9 | 7.9 |
| Guelph | 111 | 72.1 | 9.2 |
| Lakehead | 23 | 67.4 | 8.7 |
| Laurentian | 30 | 73.4 | 9.1 |
| McMaster | 126 | 71.2 | 9.2 |
| Ottawa | 67 | 72.8 | 8.1 |
| Toronto | 414 | 74.7 | 8.7 |
| Trent | 15 | 75.7 | 6.0 |
| Waterloo | 144 | 71.2 | 9.1 |
| Windsor | 68 | 69.6 | 8.6 |
| Program | | | |
| Humanities/Arts | 226 | 74.7 | 8.4 |
| Social Sciences | 358 | 71.7 | 8.8 |
| Sciences | 347 | 73.1 | 9.4 |
| Professions | 173 | 71.4 | 8.7 |
| Total (over Universities or Programs) | 1104 | 72.7 | 8.9 |
| Students with Unacceptable Data for Reason of: | | | |
| No University Records | 159 | 69.4 | 8.7 |
| Small Number of Secondary School Credits | 1 | 67.0 | - |

TABLE 3.92

Means and Standard Deviations of Distributions of Average Marks in SSHGD History/Geography/Other Social Science Courses

| Students with Acceptable Data, Grouped by: | N | Mean | S.D. |
|---|---|---|---|
| University | | | |
| Brock | 20 | 75.1 | 7.8 |
| Carleton | 60 | 73.3 | 7.0 |
| Guelph | 83 | 72.4 | 7.8 |
| Lakehead | 15 | 70.0 | 10.5 |
| Laurentian | 27 | 73.9 | 8.4 |
| McMaster | 83 | 72.7 | 9.1 |
| Ottawa | 49 | 74.0 | 7.8 |
| Toronto | 295 | 75.3 | 9.0 |
| Trent | 15 | 78.5 | 8.4 |
| Waterloo | 107 | 72.3 | 7.8 |
| Windsor | 52 | 70.2 | 8.0 |
| Program | | | |
| Humanities/Arts | 183 | 73.7 | 8.6 |
| Social Sciences | 325 | 74.3 | 8.3 |
| Sciences | 185 | 73.4 | 8.7 |
| Professions | 113 | 73.0 | 9.2 |
| Total (over Universities or Programs) | 806 | 73.7 | 8.6 |
| Students with Unacceptable Data for Reason of: | | | |
| No University Records | 132 | 70.0 | 9.4 |
| Small Number of Secondary School Credits | 3 | 74.3 | 16.8 |

TABLE 3.93

Means and Standard Deviations of Distributions of Average Marks in SSHGD Mathematics/Science Courses

| Students with Acceptable Data, Grouped by: | N | Mean | S.D. |
|---|---|---|---|
| University | | | |
| Brock | 25 | 70.5 | 20.8 |
| Carleton | 75 | 67.8 | 9.6 |
| Guelph | 14 | 71.0 | 9.7 |
| Lakehead | 25 | 68.9 | 8.7 |
| Laurentian | 29 | 69.8 | 9.9 |
| McMaster | 137 | 71.0 | 11.1 |
| Ottawa | 64 | 71.2 | 9.1 |
| Toronto | 447 | 73.9 | 10.1 |
| Trent | 12 | 75.7 | 9.4 |
| Waterloo | 191 | 73.7 | 10.3 |
| Windsor | 69 | 67.9 | 10.1 |
| Program | | | |
| Humanities/Arts | 178 | 69.7 | 11.0 |
| Social Sciences | 348 | 68.2 | 8.9 |
| Sciences | 465 | 76.1 | 9.8 |
| Professions | 207 | 71.7 | 9.8 |
| Total (over Universities or Programs) | 1198 | 72.1 | 10.3 |
| Students with Unacceptable Data for Reason of: | | | |
| No University Records | 152 | 68.8 | 9.6 |
| Small Number of Secondary School Credits | 8 | 70.3 | 13.8 |

TABLE 3.94

Means and Standard Deviations of Distributions of Average Marks in All SSHGD Courses

| Students with Acceptable Data, Grouped by: | N | Mean | S.D. |
|---|---|---|---|
| University | | | |
| Brock | 29 | 72.6 | 8.8 |
| Carleton | 87 | 71.0 | 7.1 |
| Guelph | 126 | 72.9 | 7.8 |
| Lakehead | 26 | 69.4 | 7.0 |
| Laurentian | 33 | 72.6 | 7.7 |
| McMaster | 145 | 73.0 | 8.9 |
| Ottawa | 72 | 73.1 | 7.1 |
| Toronto | 489 | 75.5 | 8.1 |
| Trent | 15 | 76.5 | 7.3 |
| Waterloo | 194 | 74.1 | 8.3 |
| Windsor | 74 | 70.2 | 8.0 |
| Program | | | |
| Humanities/Arts | 229 | 73.9 | 7.7 |
| Social Sciences | 384 | 71.6 | 7.3 |
| Sciences | 465 | 75.8 | 8.7 |
| Professions | 212 | 72.8 | 8.1 |
| Total (over Universities or Programs) | 1290 | 73.7 | 8.2 |
| Students with Unacceptable Data for Reason of: | | | |
| No University Records | 181 | 70.2 | 7.7 |
| Small Number of Secondary School Credits | 11 | 72.2 | 12.1 |

TABLE 3.95

Means and Standard Deviations of Distributions of Average Marks in First Year University Courses

| Students with Acceptable Data, Grouped by: | N | Mean | S.D. |
|---|---|---|---|
| University | | | |
| Brock | 29 | 69.6 | 7.8 |
| Carleton | 87 | 68.9 | 7.2 |
| Guelph | 126 | 68.6 | 7.1 |
| Lakehead | 26 | 65.1 | 6.3 |
| Laurentian | 33 | 70.1 | 6.9 |
| McMaster | 145 | 67.7 | 8.5 |
| Ottawa | 72 | 69.8 | 6.9 |
| Toronto | 489 | 68.4 | 7.1 |
| Trent | 15 | 75.8 | 10.4 |
| Waterloo | 194 | 70.6 | 7.9 |
| Windsor | 74 | 70.5 | 7.6 |
| Program | | | |
| Humanities/Arts | 229 | 70.8 | 7.1 |
| Social Sciences | 384 | 68.3 | 6.8 |
| Sciences | 465 | 69.0 | 8.7 |
| Professions | 212 | 68.0 | 6.2 |
| Total (over Universities or Programs) | 1290 | 69.0 | 7.6 |

TABLE 3.96

Summary of Results from Regression Analysis
of University Average Marks

| Predictors (in Order of Entry to Regression Analysis) | Unaccounted Variance | R | F-Ratio | d.f.[a] |
|---|---|---|---|---|
| None | 57.23[b] | - | - | - |
| Grade Thirteen Mark Average (all courses) | 37.63 | 0.59 | 672.35 | 1;1288 |
| University Attended | 35.24 | 0.62 | 9.75 | 10;1278 |
| Program of Study at University | 33.99 | 0.64 | 16.59 | 3;1275 |
| Secondary School Attended | 30.11 | 0.69[c] | 2.48 | 111;1164 |

Note: R is the multiple correlation. The F-Ratio tests the significance of the contribution to prediction by the addition of a predictor to the set formed by the predictors named higher in the table.

[a]Degrees of freedom for F.

[b]Variance of the distribution of first year mark averages.

[c]The multiple correlation coefficient in the population that would be obtained from using the regression equation developed in the population, given this sample result, is estimated to be 0.64 (see Darlington, 1968, for a discussion of this matter). The other multiple correlation coefficients reported in this table are themselves approximately equal to the estimates of the population values.

TABLE 3.97

Estimated Regression Coefficients in Final Regression Analysis of University Average Marks

| Predictor | Regression Coefficients (B) | S.E. of B |
|---|---|---|
| Grade Thirteen Mark Average (All Courses) | 0.60 | 0.02 |
| University | | |
| Brock | -0.60 | 1.15 |
| Carleton | 0.18 | 0.75 |
| Guelph | -1.31 | 0.56 |
| Lakehead | -0.31 | 1.33 |
| Laurentian | 1.33 | 1.04 |
| McMaster | -2.43 | 0.58 |
| Ottawa | -0.44 | 0.97 |
| Toronto | -4.35 | 0.46 |
| Trent | 3.83 | 1.41 |
| Waterloo | 0.45 | 0.49 |
| Windsor | 3.66 | -[a] |
| Program | | |
| Humanities/Arts | 1.78 | 0.33 |
| Social Sciences | 0.60 | 0.28 |
| Sciences | -1.36 | 0.27 |
| Professions | -1.02 | -[a] |

Note: The constant of regression in this analysis was 26.50.

[a]This regression coefficient was obtained by subtraction, hence its standard error was not estimated.

TABLE 3.98

Frequency Distribution of Regression Coefficients for Secondary Schools in Final Regression Analysis of University Average Marks

| Class Interval for B | Frequency |
|---|---|
| 5.5 to 6.4 | 3 |
| 4.5 to 5.4 | 2 |
| 3.5 to 4.4 | 6 |
| 2.5 to 3.4 | 14 |
| 1.5 to 2.4 | 8 |
| 0.5 to 1.4 | 17 |
| -0.5 to 0.4 | 20 |
| -1.5 to -0.4 | 9 |
| -2.5 to -1.4 | 14 |
| -3.5 to -2.4 | 7 |
| -4.5 to -3.4 | 6 |
| -5.5 to -4.4 | 2 |
| -6.5 to -5.4 | 1 |
| -7.5 to -6.4 | 3 |
| | N = 112 |

TABLE 3.99

Frequency Distribution of the Number of Students From Each Secondary School Included in the Regression Analysis of University Mark Averages

| Number of Students | Frequency of Secondary Schools |
|---|---|
| 28-30 | 5 |
| 25-27 | 3 |
| 22-24 | - |
| 19-21 | 8 |
| 16-18 | 11 |
| 13-15 | 5 |
| 10-12 | 18 |
| 7-9 | 49 |
| 4-6 | 10 |
| 1-3 | 3 |
| | N = 112 |

TABLE 3.100

Summary of Results From Regression Analysis of University Average Marks in Humanities/Arts Courses by Humanities/Arts Students (Ignoring University of Attendance)

| Predictors (In Order of Entry to Regression Analysis) | Unaccounted Variance | R | F-Ratio | d.f.[a] |
|---|---|---|---|---|
| None | 45.10[b] | - | - | - |
| Grade Thirteen Mark Average in Language Courses | 32.94 | 0.52 | 83.27 | 1;222 |
| Secondary School Attended | 30.38 | 0.57 | 1.22[c] | 85;137 |

Note: To interpret R and F-Ratio, see Table 3.96. The constant of regression for the final analysis was 34.75 and the regression coefficient in this analysis for the Grade Thirteen mark average in language courses was 0.49 with a standard error of 0.06. The number of secondary schools for which there were data on one or more students for this analysis was 86. The regression coefficients for these schools are not reported.

[a]Degrees of freedom for F.

[b]Variance of the distribution of first year mark averages attained by students in the Humanities/Arts program category in Humanities/Arts courses.

[c]This F-Ratio is not statistically significant ($p = 0.05$).

TABLE 3.101

Summary of Results From Regression Analyses of University Average Marks in Science Courses Attained by Sciences Students (Ignoring University of Attendance)

| Predictors (In Order of Entry to Regression Analysis) | Unaccounted Variance | R | F-Ratio | d.f.[a] |
|---|---|---|---|---|
| None | 94.44[b] | - | - | - |
| Grade Thirteen Mark Average in Mathematics/ Science Courses | 62.48 | 0.58 | 230.65 | 1;448 |
| Secondary School | 53.11 | 0.66[c] | 1.74 | 107;341 |

Note: To interpret R and F-Ratio, see Table 3.96. In the final analysis, the constant of regression was 26.20, and the regression coefficient for Grade Thirteen mark average in mathematics/science courses was 0.56 with a standard error of 0.04. The number of secondary schools for which there were data on one or more students for this analysis was 108. The regression coefficients for these schools are not reported.

[a]Degrees of freedom for F.

[b]Variance of the distribution of first year mark averages in science courses attained by students in the sciences program category.

[c]The multiple correlation coefficient in the population that would be obtained from using the regression equation developed in the population, given this sample result, is estimated to be 0.51. The other multiple correlation coefficient in this table is itself approximately equal to the estimates of the population values.

TABLE 3.102

Summary of Regression Analyses of University Average Marks in Science Courses Attained by Sciences Students Attending Four Universities

| Predictors (In Order of Entry to Regression Analysis) | Unaccounted Variance | R | F-Ratio | d.f.[a] |
|---|---|---|---|---|
| None | 92.12[b] | - | - | - |
| Grade Thirteen Mark Average in Mathematics/ Science Courses | 59.55 | 0.59 | 208.86 | 1;379 |
| University Attended | 58.04 | 0.61 | 4.28 | 3;376 |
| Secondary School Attended | 49.15 | 0.68[c] | 1.69 | 98;278 |

[a]Degrees of freedom for F.

[b]Variance of the distribution of first-year mark averages in science courses attained by those students in four universities in the sciences program category.

[c]The multiple correlation coefficient in the population that would be obtained from using the regression equation developed in the population, given the sample result, is estimated to be 0.52. The other multiple correlation coefficients in this table are themselves approximately equal to the estimates of the population values.

TABLE 3.103

Estimated Regression Coefficients from the Final Regression Analysis of University Average Marks in Science Courses Attained by Sciences Students Attending Four Universities

| Predictor | Regression Coefficient (B) | S.E. of B |
|---|---|---|
| Grade Thirteen Mark Average in Mathematics/ Science Courses | 0.59 | 0.04 |
| University | | |
| Guelph | 0.04 | 0.91 |
| McMaster | 1.69 | 1.16 |
| Toronto | -3.19 | 0.77 |
| Waterloo | 1.46 | -[a] |

Note: The constant of regression in this analysis was 23.97. The number of secondary schools for which there were data on one or more students for this analysis was 99. The regression coefficients for the schools are not reported.

[a]This regression coefficient was obtained by subtraction, hence its standard error was not estimated.

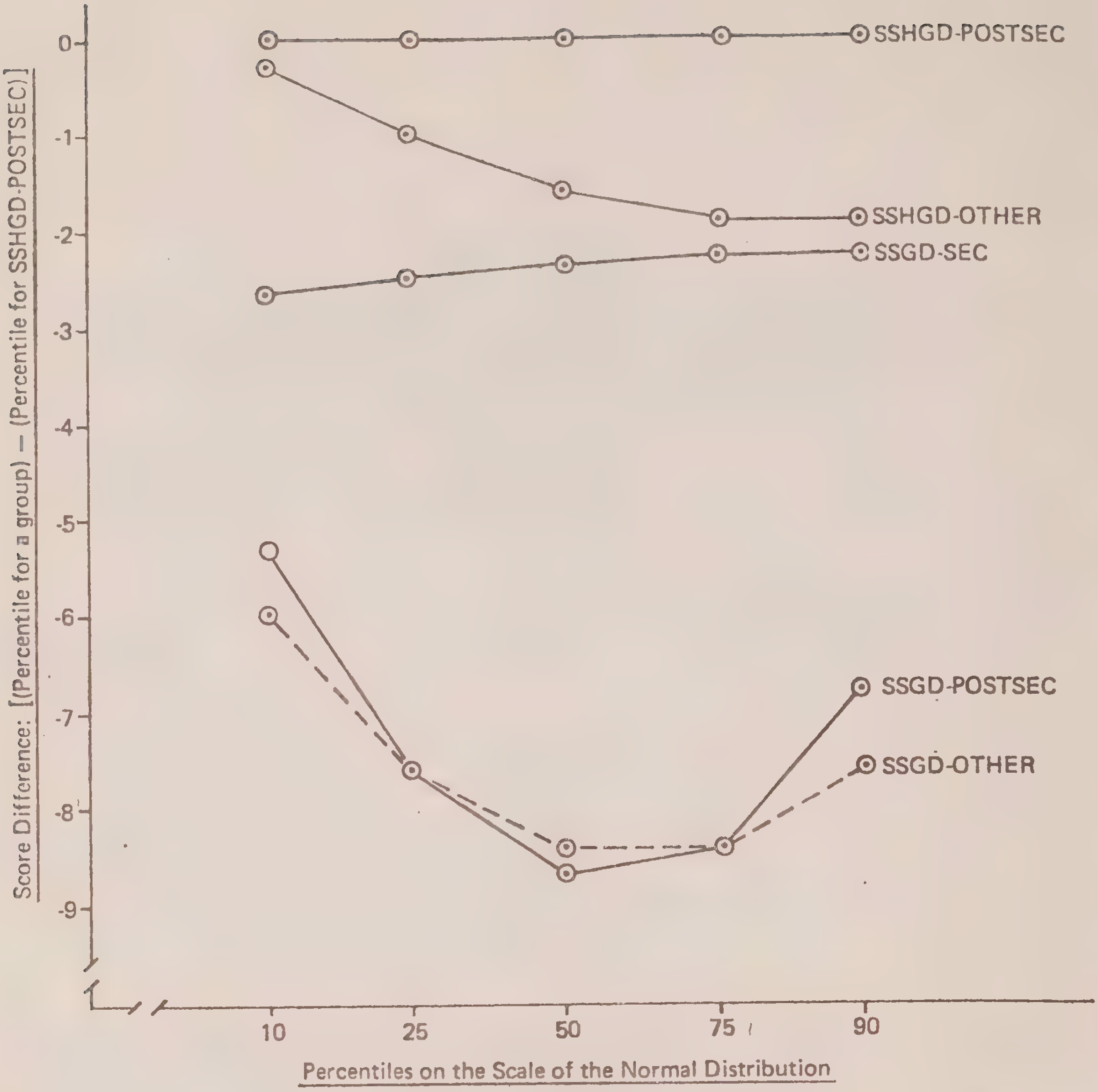


Fig. 3.1: Test of Reading Comprehension and Language Achievement (English) The SSGD students who said they were planning to return to secondary school for work on their SSHGD performed on this test, as a group, much more like the two SSHGD groups than like the other two SSGD groups. The two SSGD groups who had plans to leave school at the end of the 1975-76 academic year, the one group to pursue postsecondary studies, and the other group to take up work, get married or whatever, had similar distributions of scores on the test, and their level of performance was well below that of the other three groups.

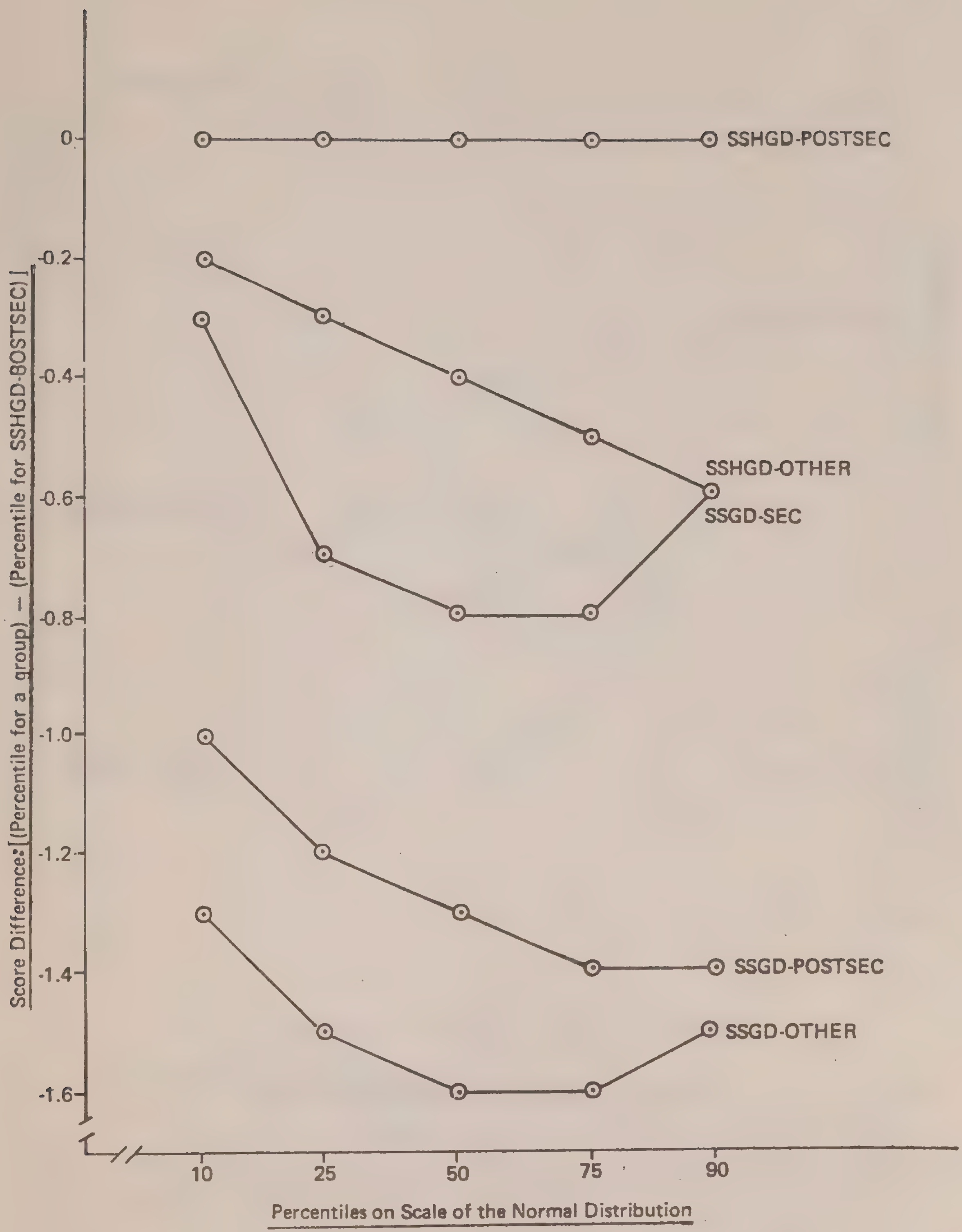


Fig. 3.2: Writing Test
The disparity between the quality of writing produced by the SSHGD-POSTSEC group (most of whom are going on to university) and that produced by all other groups of students tends to increase, the higher the percentile rank of the score. The SSGD-SEC group (planning to take Grade 13) clearly outperformed the other two SSGD groups. Presumably, the difference between the curve for SSGD-SEC and the curve for either of the two SSHGD groups reflects, in large part, the effect of the Grade 13 year on the writing abilities of students.

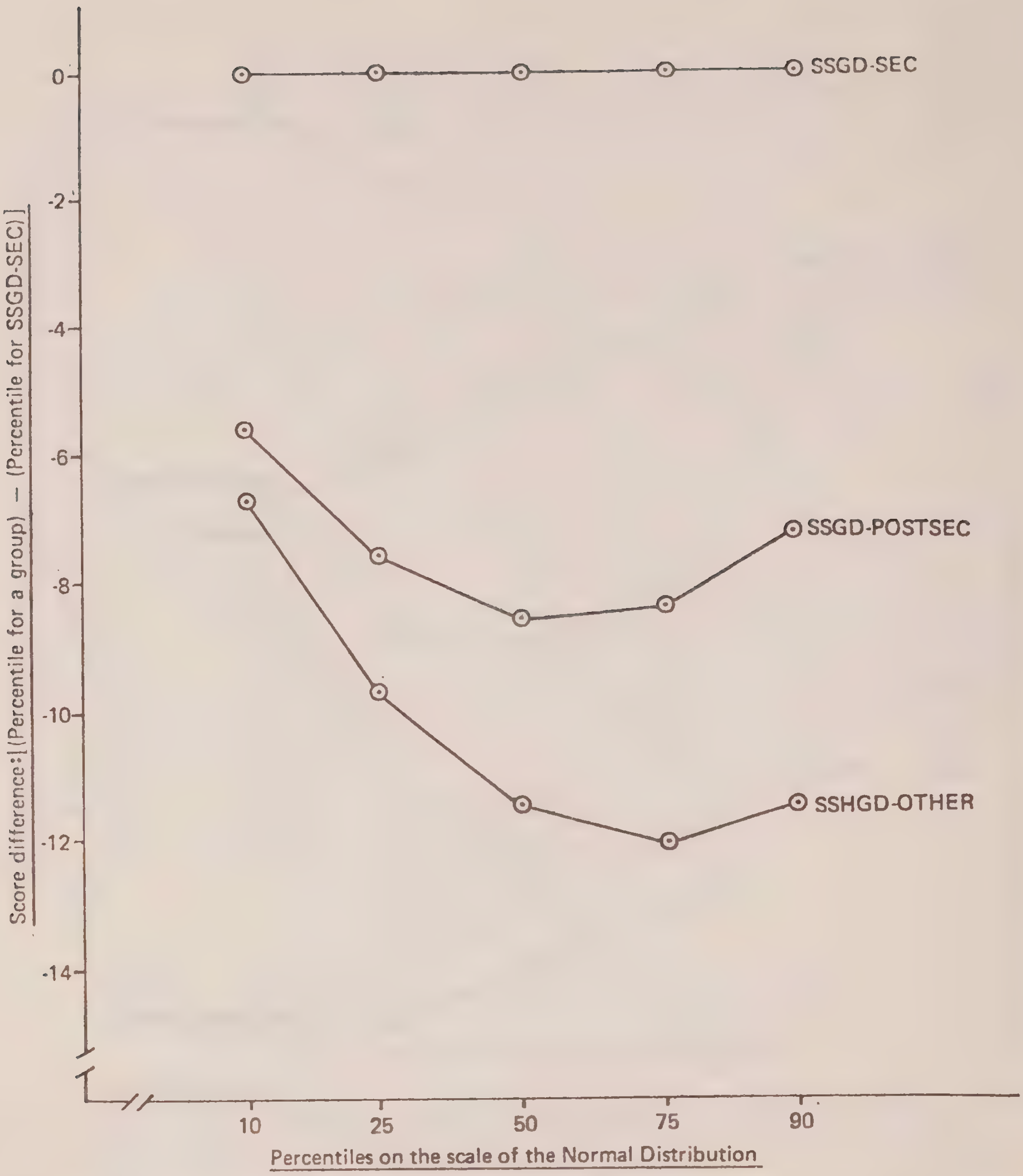


Fig:3.3: Test of Arithmetic and Basic Algebra
The difference in performance between the SSGD-SEC group and the other SSGD groups is relatively large at the low end of the distributions for all groups and tends to increase across the range of the distributions, at least through to the 75th percentile. There is some hint of recovery on the part of the two low-scoring groups over the range from the 75th percentile to the 90th. Group differences depicted here do not arise because one group studies mathematics and the others do not. The groups were differentiated solely in terms of their plans for 1976-77. Consequently, each group contains students who take mathematics and others who do not.

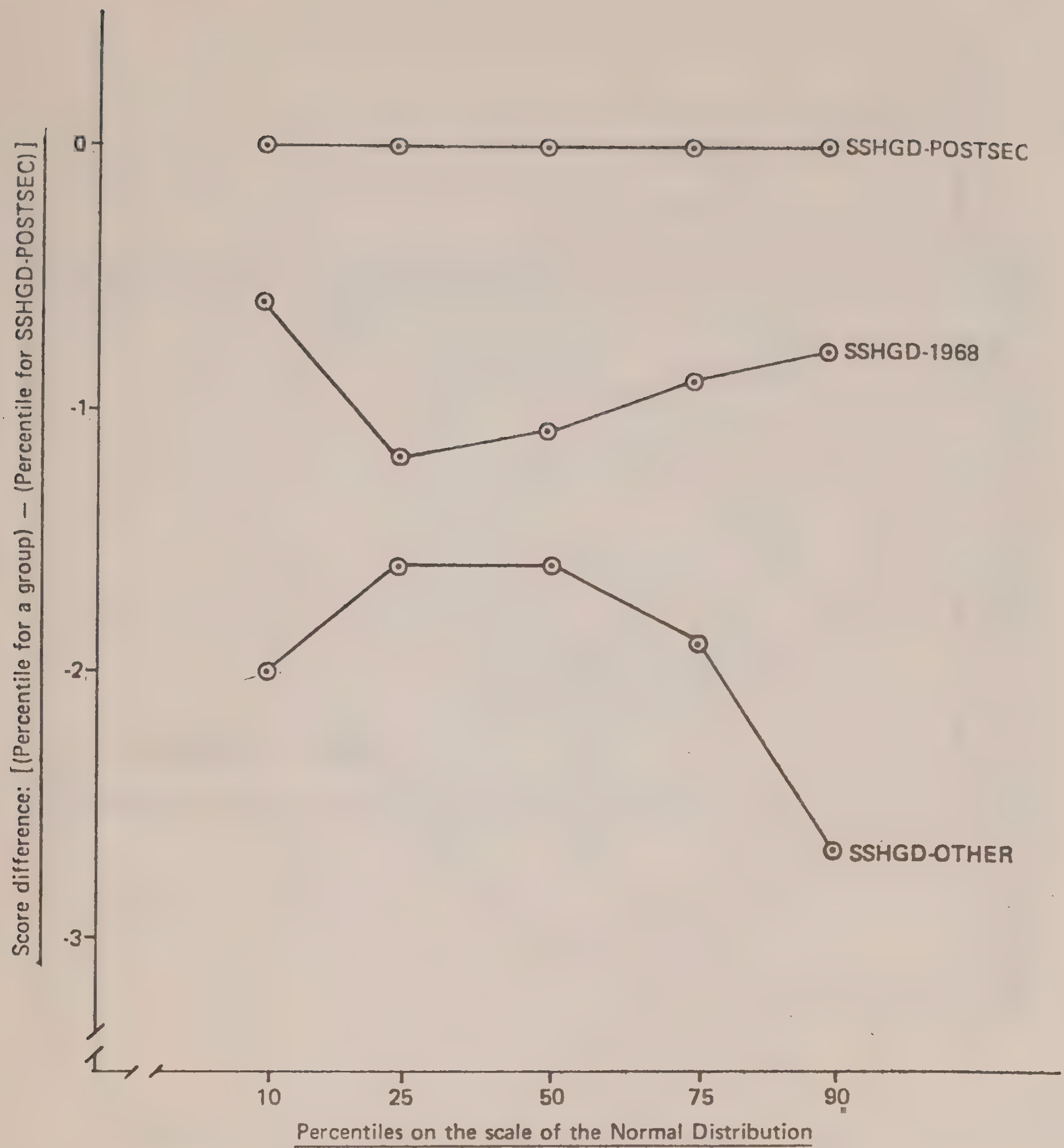


Fig. 3.4: Mathematics Achievement Test
The 1976 SSHGD students in the group composed predominently of students who planned to go on to university outscored the 1968 SSHGD students who were applying to university by about one score point right across the range of the score distributions (see the two top curves). The SSHGD students in the 1976 sample who had no plans to continue their education in 1976-77 performed least well among the three groups.

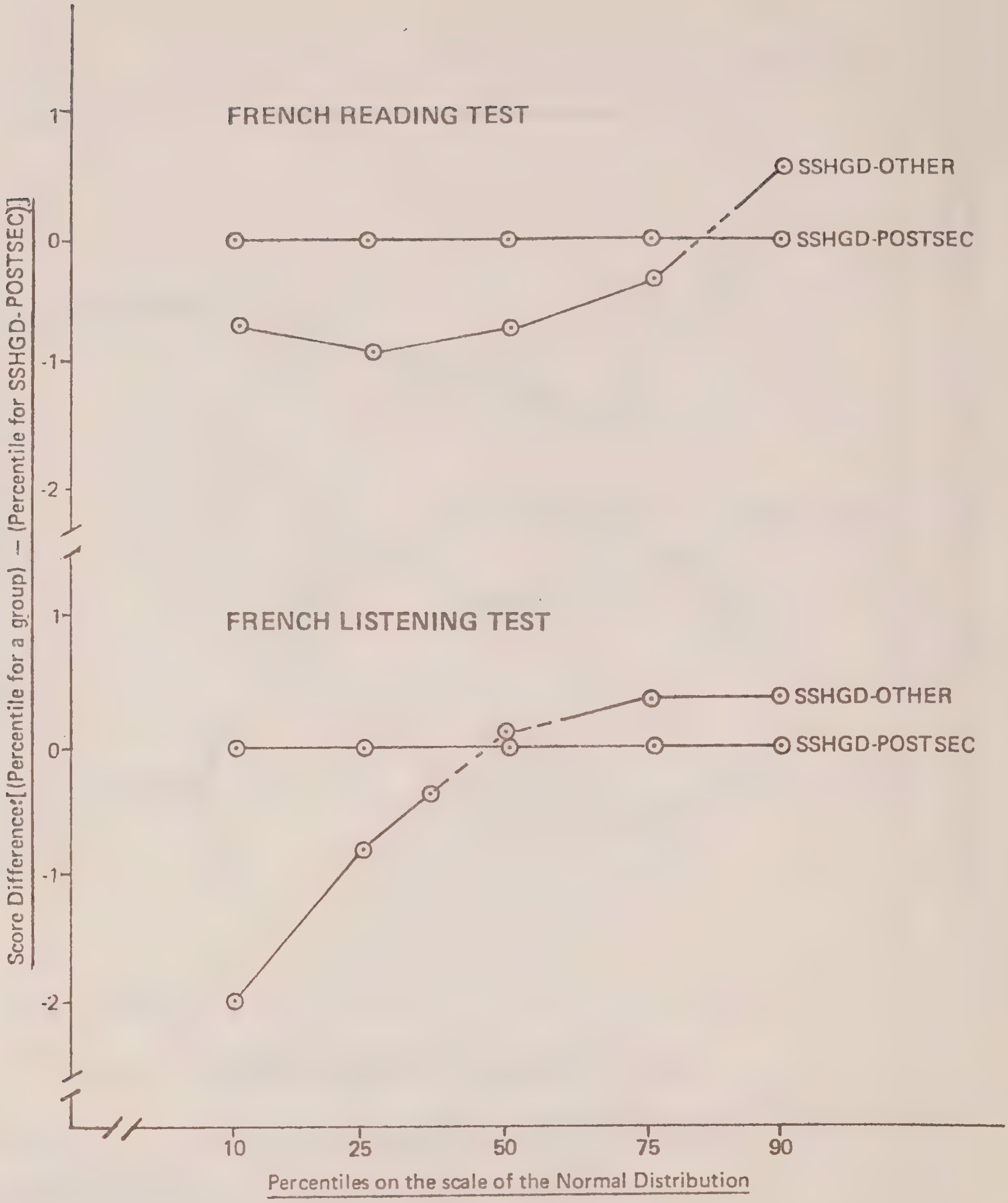


Fig. 3.5: French Reading Test and Listening Test
A cross-over effect is seen in the results for both tests. The SSHGD group going on to univeristy (SSHGD-POSTSEC) had the higher percentiles at the low end of the score distributions but the SSHGD group not planning to continue their education in 1976-77 had the higher percentiles at the upper end of the score distributions.

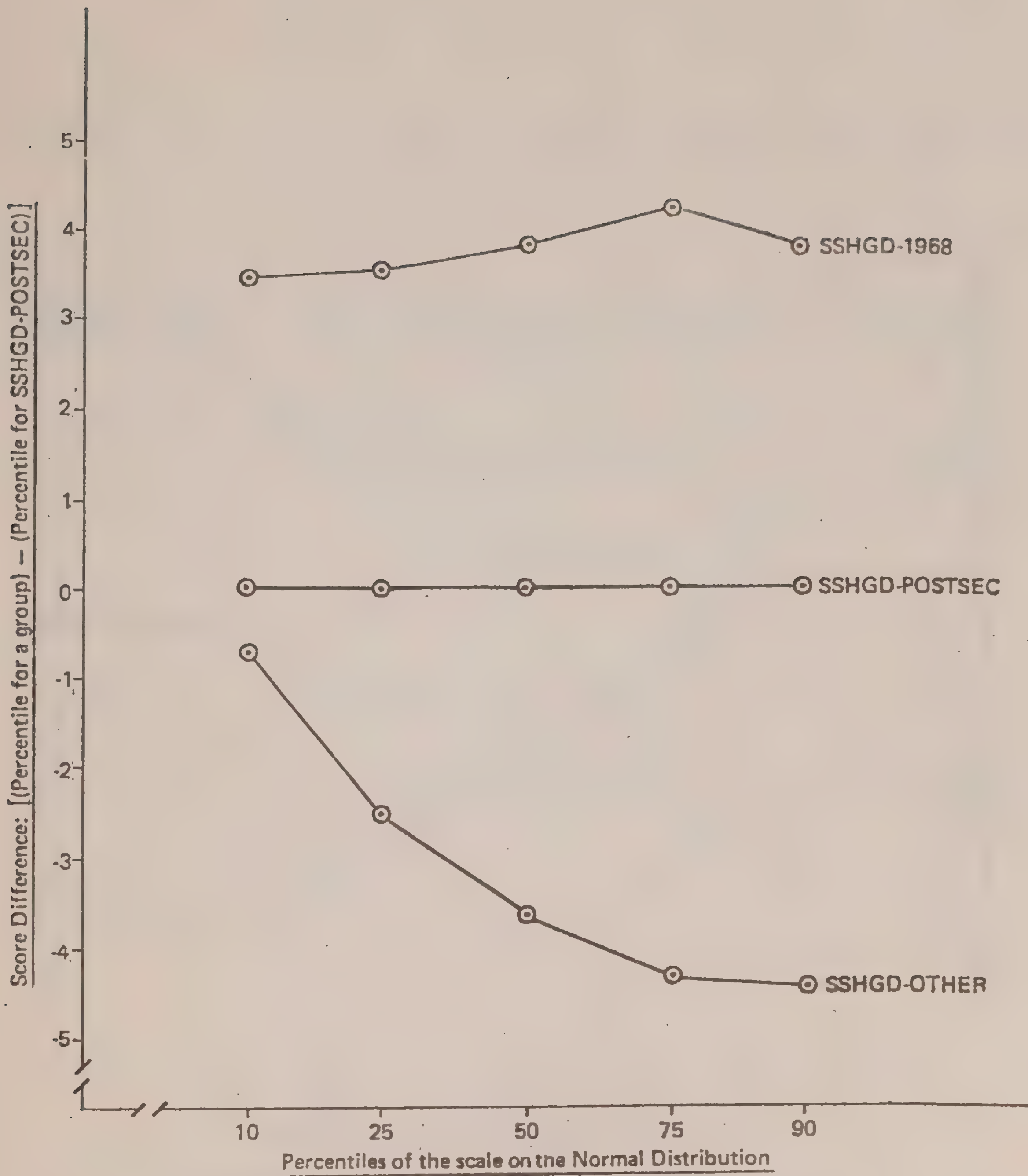


Fig. 3.6: Physics Achievement Test
The decline in performance between 1970 and 1976 amounts to between 3 and 4 test score points, right across the range of the distributions of scores for Groups SSHGD-1970 and SSHGD-POSTSEC (top two curves). Students who were taking physics but were not going on to a postsecondary institution in 1976-77 did very much worse on the test than the students who were planning to continue their education; the difference is especially large for students at the upper end of both score distributions.

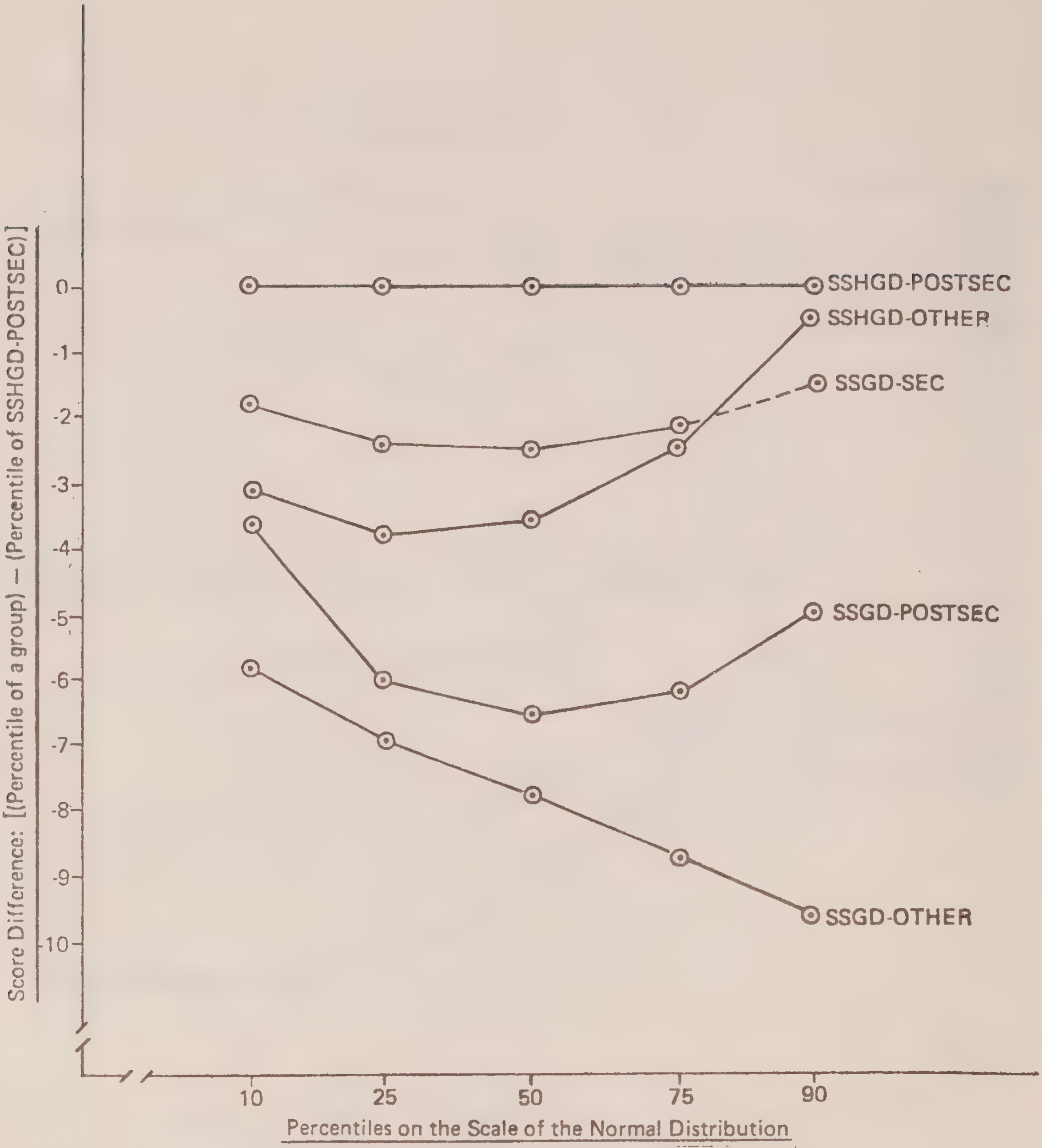


Fig. 3.7: Test de compréhension en lecture et de connaissance de la langue (français)

SSGD students progressing to Grade 13 (SSGD-SEC) differ in their performance from Grade 13 students going on to postsecondary study (SSHGD-POSTSEC) by approximately two test score points, right across the range of scores achieved by both groups; this difference may be regarded, in some sense, as the "incremental value of Grade 13" for performance on this test. With a minor exception at the upper end of the distribution of scores for Group SSHGD-OTHER, all the remaining groups did less well than Group SSGD-SEC, relative to Group SSHGD-POSTSEC. The increasing difference from the low end to the high end of the score range between SSHGD-POSTSEC and SSGD-OTHER is particularly striking.

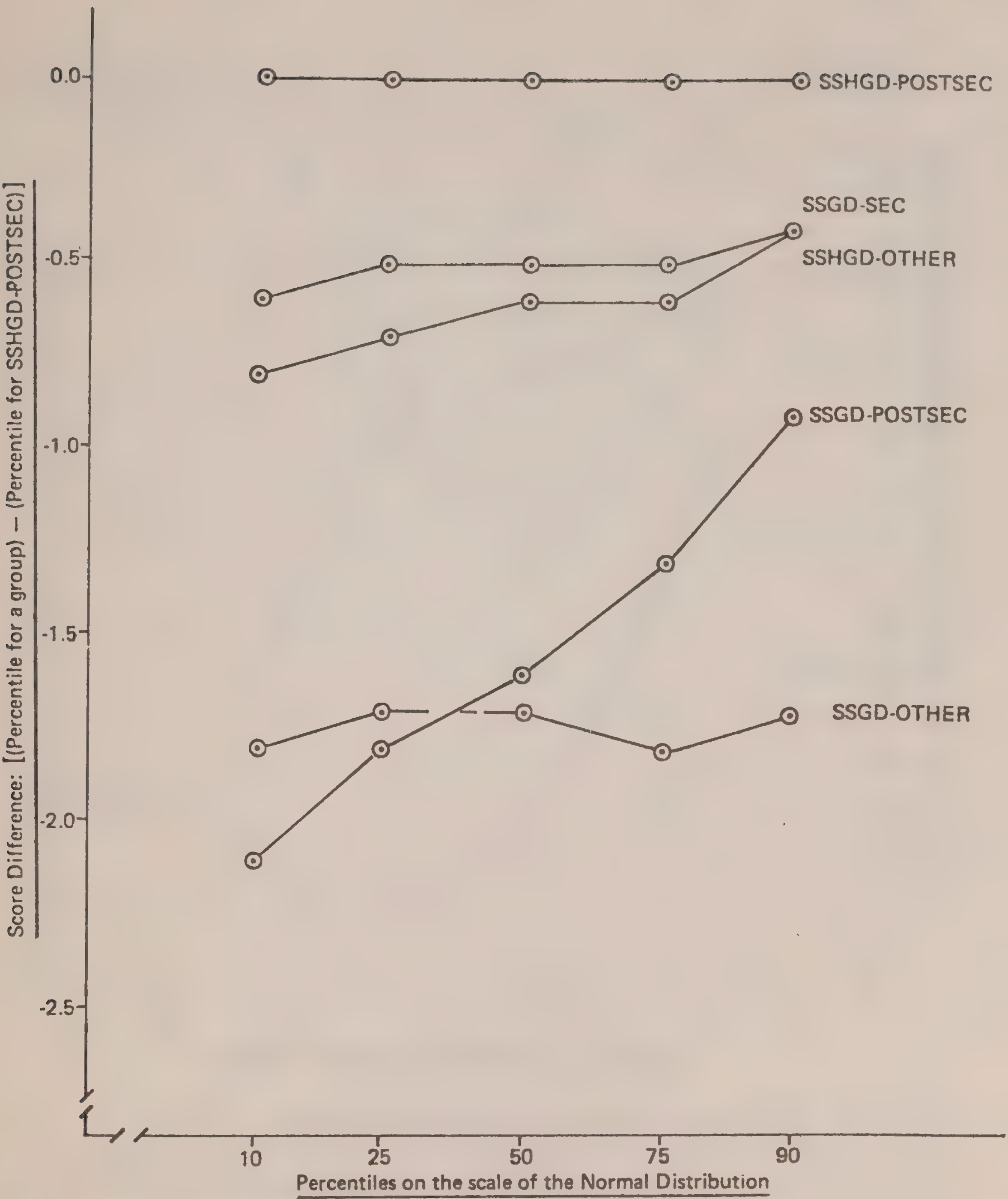


Fig. 3.8: Composition écrite
Three levels of performance are apparent in the results of this test. The highest level was achieved by the SSHGD group with plans for post-secondary studies in 1976-77. Two groups, the "other" SSHGD students and the SSGD students who were planning to carry on to Grade Thirteen, performed at a second, somewhat lower, level. The third and lowest level of performance was attained by the two SSGD groups who planned to leave school, the one to seek further education in a testing institution, the other to do other things (e.g., work). Within this lowest level, the better students in the SSGD-POSTSEC group wrote considerably better essays than the better students in the SSGD-OTHER group.

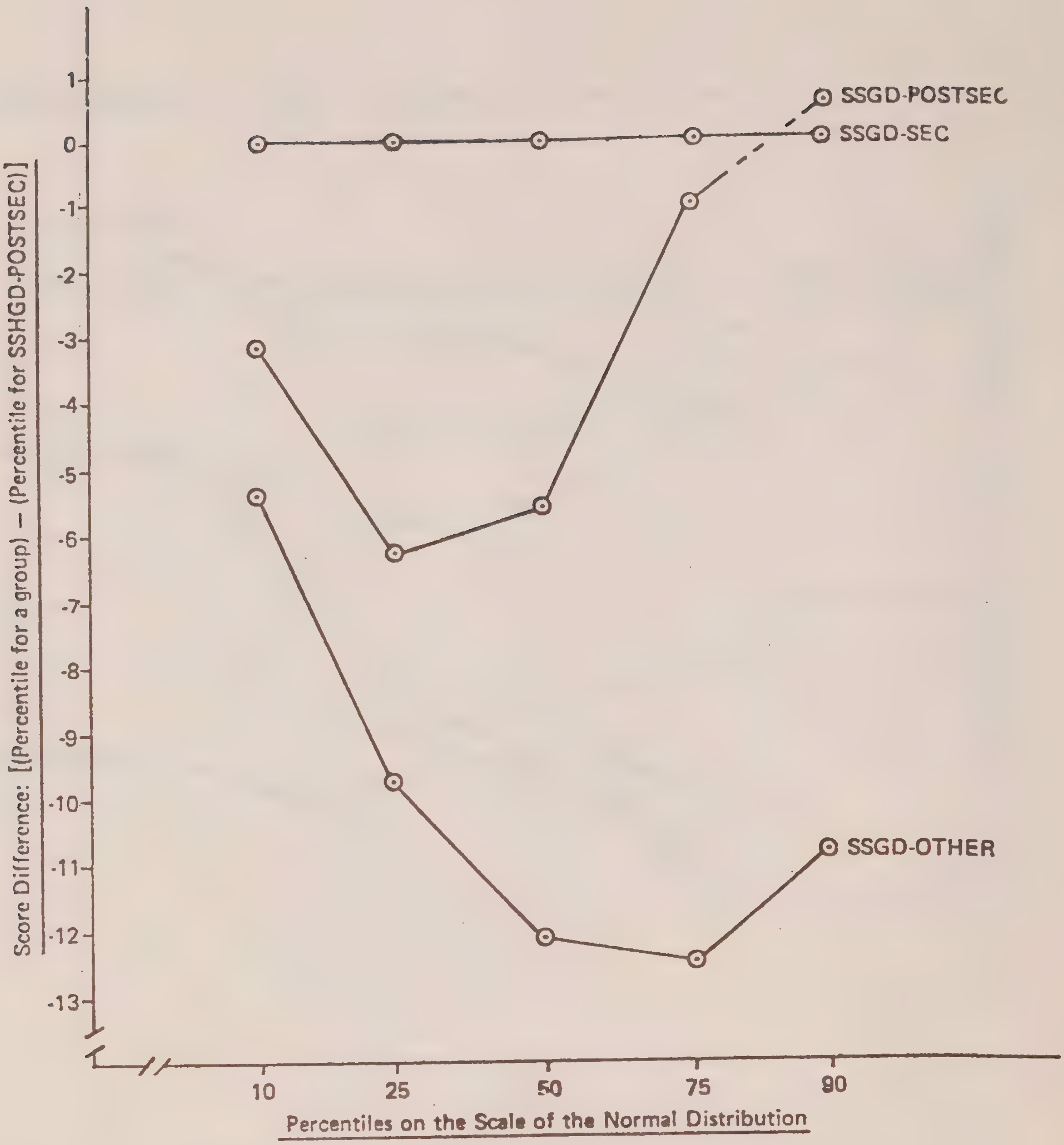


Fig. 3.9: Test of Arithmetic and Basic Algebra
SSGD students going on to postsecondary education demonstrated less facility on the average in arithmetic and basic algebra than their classmates with plans to return to secondary school. Only the higher scoring students in both these groups performed at approximately the same level. Those SSGD students who planned to leave school to work, get married, etc. did much worse than either of the other groups; the difference is largest for students at the upper end of the score distributions.

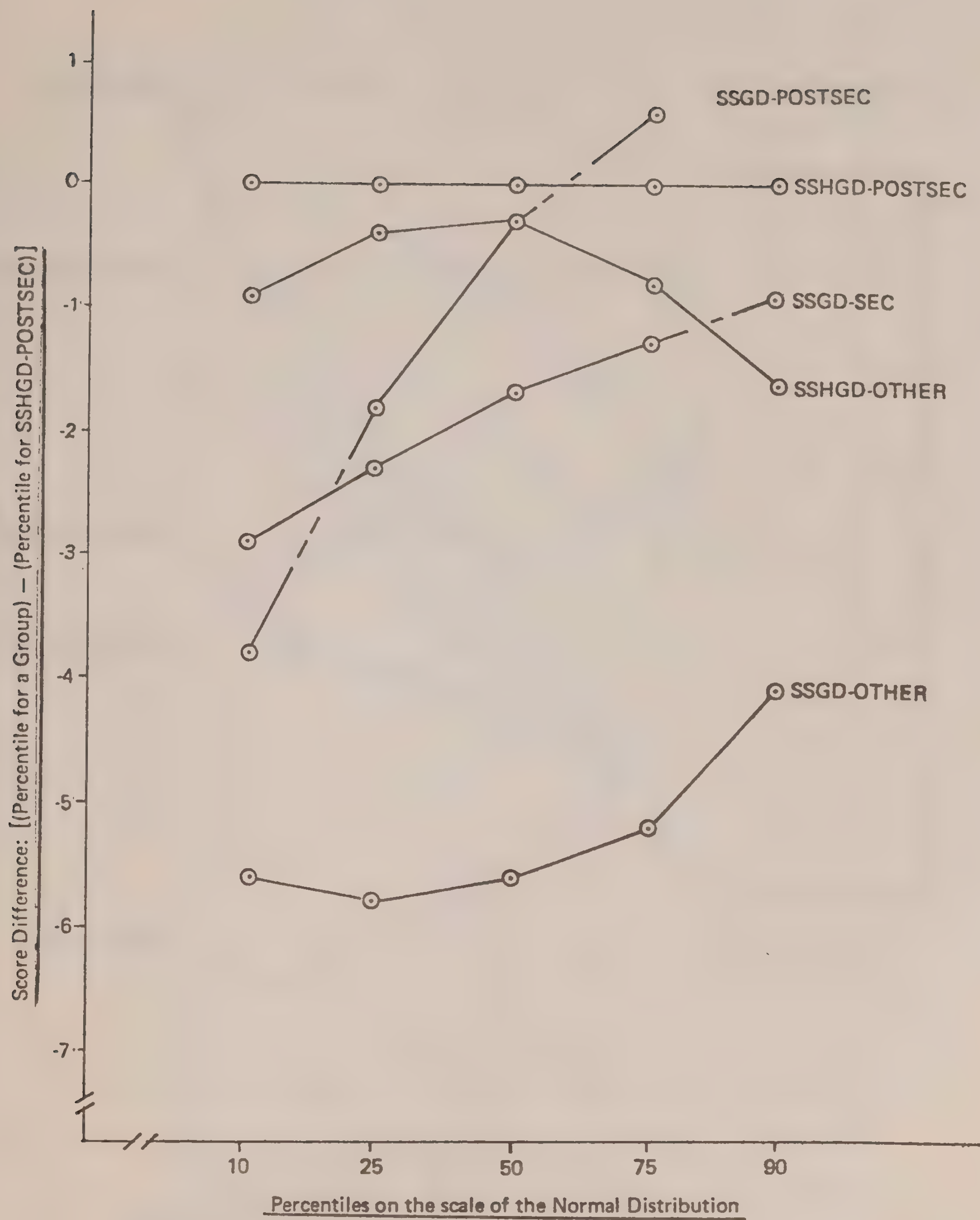


Fig. 3.10: Test de connaissance de la langue (anglais)-Reading Comprehension Part

The group that stands out here because of its relatively poor performance is composed of Grade Twelve students with plans to leave school with an SSGD and take up employment, get married, etc. Another noteworthy feature of this figure is the orientation of the curves for both SSGD-SEC and SSGD-POSTSEC. They begin much lower than the SSHGD-POSTSEC curve and rise steeply toward the latter curve, indicating that the better readers in both these groups performed on a par, or nearly so, with the better readers in the SSHGD-POSTSEC group; on the other hand, the poorer readers in the SSHGD-POSTSEC groups read very much better than the poorer readers in either the SSGD-POSTSEC groups.

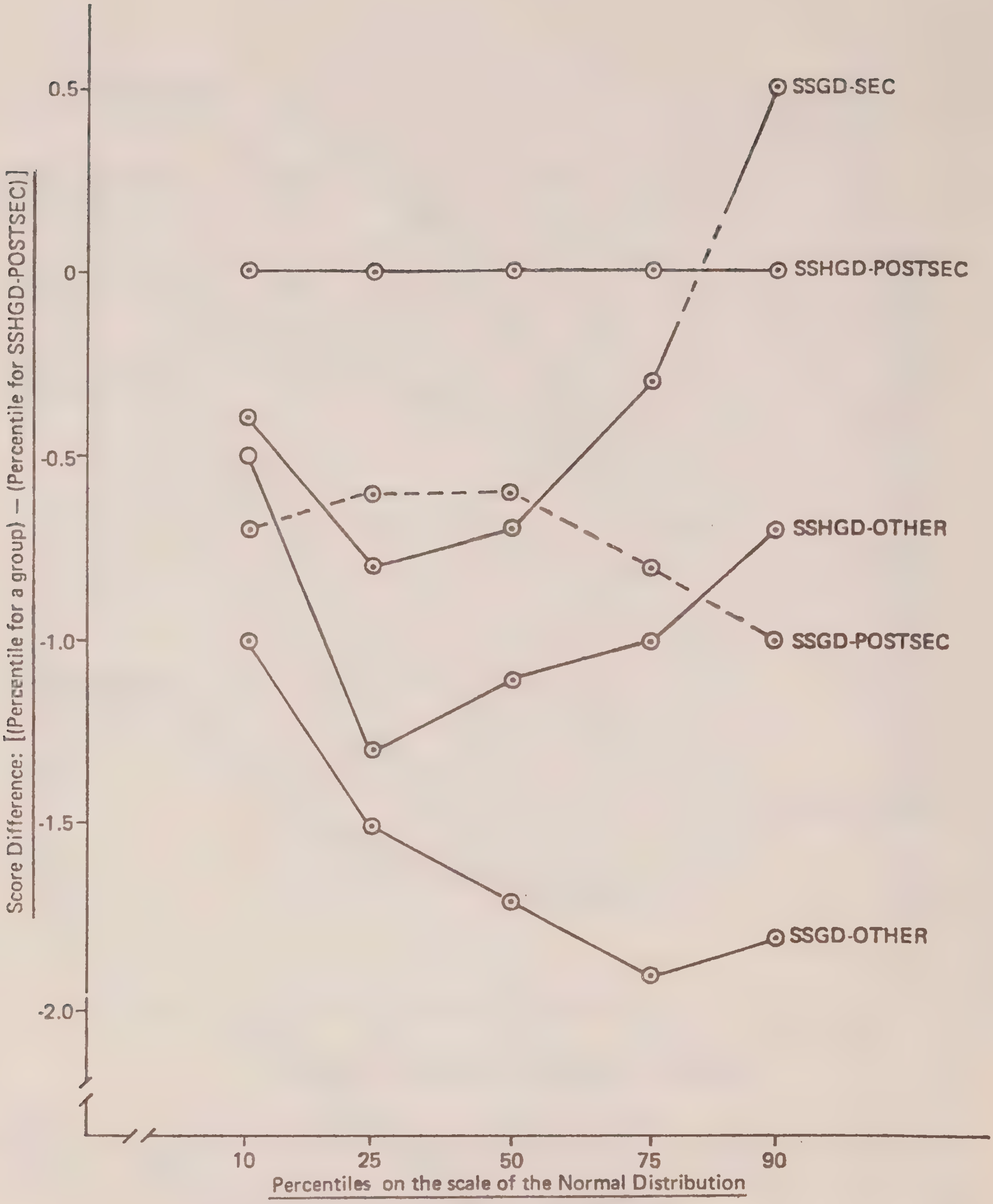


Fig. 3.11: Test de connaissance de la langue (anglais)-Writing Part: Summary

The standard of quality set by the SSHGD level students going on to postsecondary study was equalled and surpassed by only a few of the SSGD level students going on to Grade 13. The better SSGD-SEC students, those in the upper 25 per cent of the score distribution, did as well as, or better than, the better SSHGD-POSTSEC students. The performance of those SSGD level students who were leaving school to take up work, get married, etc., is noteworthy because it is relatively poor and increasingly so right across the range of the score distribution, from the lowest to the highest scores.

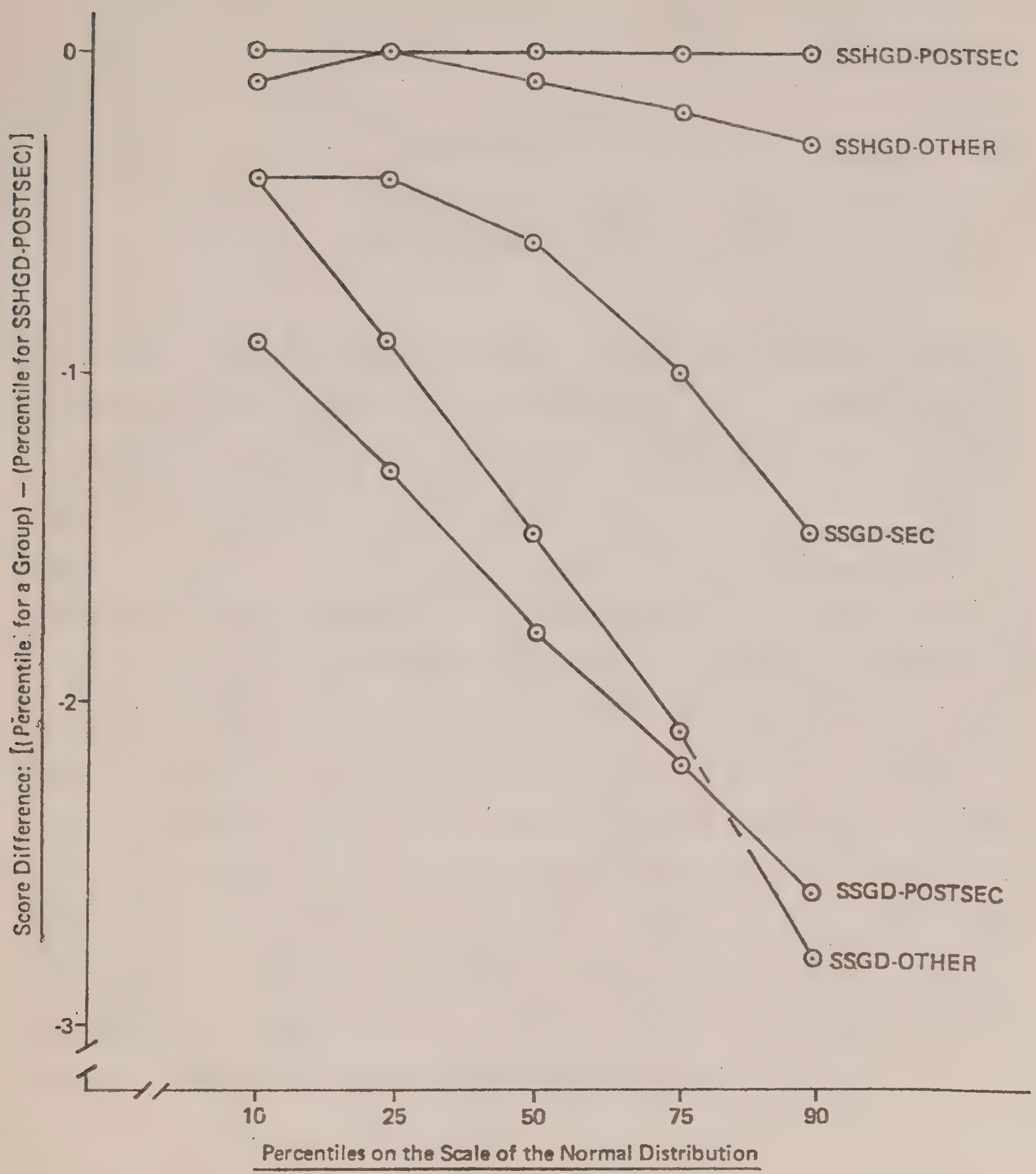


Fig. 3.12: Test de connaissance de la langue (anglais)-Writing Part: Commentary

At the low end of the score distributions for the five groups, all intergroup differences are relatively small, but at the high end, there are some relatively large differences. In general, the best of the commentaries written by SSHGD students were judged to be very much better than the best of the commentaries written by SSGD students.

# CHAPTER FOUR

## GENERAL CONCLUSIONS AND LIMITATIONS

The present study was large in scope, and it involved a very complex sampling procedure. Moreover, the time-line for the conduct of the study was impossibly short. Because of this, and here we paraphrase J.B. Carroll's summary comment on the IEA study of the teaching of French as a foreign language (Carroll, 1975, p.14), we regard this report, and the study that underlies it, as incomplete and unfinished. Partly because of the limitations of time, partly because of the mechanics of a province-wide survey in which information had to be collected from various distant locations, and partly because some of the data we needed had to be collected during the summer months when the persons who had the information were on holiday, it was not possible for us to perform all the analyses that we would have liked to perform. We hope that such analyses will eventually be undertaken. Nevertheless, we believe that the main conclusions presented here would not be materially altered with further and more detailed explorations of the data. (Here we conclude our paraphrase of Carroll's comment.) Just what conclusions are possible? Let us consider, beginning with the SSGD/SSHGD Surveys.

### 1. ANGLOPHONE SSGD/SSHGD SURVEY

1. Students at the Secondary-Postsecondary Interface came from diverse backgrounds, but the heterogeneity tended to be less within subgroups of the SSHGD and SSGD populations than in the population at large. Students in the SSHGD population who reported having plans to pursue postsecondary studies--this group comprised roughly 80 per cent of our SSHGD sample--when compared

with the SSHGD students who reported having other plans, (e.g. work, return to secondary school, marriage, travel), tended to come from homes where parents had more formal education and, perhaps as a consequence of their education, also held better jobs. In the SSGD population, those with plans to carry on in secondary school, presumably to an SSHGD--this group comprised 54 per cent of our sample--also tended to come from homes where parents had more formal education and held better jobs than parents of the "other" SSGD students. The disparity was relatively small in the case of that 17 per cent of the "other" SSGD students who reported plans to pursue further education at the tertiary level; it was more marked in the case of that 30 per cent of SSGD students who were leaving school to take up work, get married, travel, etc.

2. Anglophone students at the Interface were found to vary quite considerably in the number of courses they had taken during their secondary school careers in each of several different categories of courses. Not unexpectedly, students at the SSGD level who had plans to return to secondary school, presumably to work for an SSHGD, had taken, on the average, more courses in traditional academic (core) subjects--English, French, another language, history, geography, mathematics, science--and had taken more of these courses at the advanced level of difficulty, than had students with plans to pursue postsecondary study following the SSGD. The average student in both of these groups had taken a much more heavily "academic" program in secondary school than had the average student in the SSGD group leaving school for work or other pursuits.

3. There was not as much diversity among Anglophone students in the study of English and mathematics in secondary school as some of the popular criticisms levelled at the secondary school would lead one to expect. The vast majority of students we surveyed at the Interface had earned credits in English at an average rate of one credit per year. Over 50 per cent of students in general, and over 70 per cent of those in the SSGD population going on to secondary school and in the SSHGD population going on

to postsecondary studies, had also earned credits in mathematics at the rate of one per year.

4. SSHGD students with plans to go on to postsecondary study had prepared themselves for that study by taking, on the average, five credits per year in traditional (core) academic subjects at the advanced level of difficulty.

5. Substantial differences were noted in the performances of different groups on the achievement tests. SSHGD students, especially those with plans to pursue postsecondary study, outperformed the SSGD students, including those continuing on to Grade Thirteen, on the measures of English language competence. On the average, SSHGD students wrote better essays, gave evidence of better reading for comprehension, and performed the language achievement exercises better than the SSGD students. Among the SSGD students, those continuing in secondary school did best, on the average, on the tests of English language competence and on the test of arithmetical and algebraic competence. The poorest test performance, on average, was turned in by the SSGD group who planned to leave school to pursue other activities, such as work.

6. Despite the average differences in test performance noted among the different SSHGD and SSGD groups, the distributions of scores for all groups taking a given test showed a substantial degree of overlap. Differences within a particular group of SSHGD or SSGD level students were substantially larger than differences between groups.

7. Comparisons with the past were possible for the SSHGD sample. In contrast with the students surveyed in 1956 in the Atkinson Study of Utilization of Student Resources, the SSHGD population in 1976 contained a higher percentage of females. In addition, the average parent of a student in the present survey had more years of formal education than the average parent of a student in the Atkinson survey.

The performances of 1976 SSHGD students and students from the recent past were compared on two achievement tests, one in mathematics, the other in physics. The comparison group in mathematics took the mathematics test in 1968, the comparison group in physics took the physics test in 1970. Both comparisons are complicated by the fact that the composition of the comparison groups is not known precisely. It seems, however, that average performance on the mathematics test was approximately the same in 1976 as it was in 1968. In physics, the evidence points to a substantial drop in test performance. This drop is probably due, in large measure, to the fact that the amount of class time for Grade Thirteen physics was less in 1976 than in 1970.

8. Moderately high, positive coefficients of correlation were observed between secondary school marks and scores on the achievement tests. This was true for all combinations of course marks and test scores that were studied. The correlations were in line with what would be expected, given the level of correlation typically observed in studies of school marks and test scores, and they were in line too, where comparisons were possible, with previous Ontario results.

9. The average mark awarded by a school in a particular course was compared with the average mark that it was predicted would have been awarded, given the performance of students in the school on an achievement test related to the course. This study, involving several SSHGD and SSGD courses, revealed the following facts:

(a) A positive and moderately high degree of correlation was found between the mean mark awarded for work in a given course at a given school, and the predicted mean mark for the school. This finding implies that teachers were sensitive, to a degree, to the achievement levels of students in their school relative to the achievement levels of students in other schools, and as a consequence, tended to award marks accordingly. Thus in schools where the tested achievement of students was

lower there was a tendency for marks to be lower, whereas in schools where the tested achievement of students was higher, there was a tendency for marks also to be higher.

(b) A consistently negative coefficient of correlation was found between the mean mark for a school as predicted from test performance and the difference between the observed and the predicted mean mark for a school. This correlation, which on the average over several courses at both the SSGD and SSHGD levels was relatively low, indicates that there was a tendency for students in schools where the average level of test performance was lower to receive somewhat higher marks on the average than their test performance would suggest they should have received, and for students in schools where the average level of test performance was higher, to receive somewhat lower marks, on the average, than their test performance would suggest they should have received.

(c) The coefficients of correlation among the differences between observed and predicted mean marks for different courses were consistently positive, albeit relatively small. This implies that in a school where the average mark awarded in one course was somewhat higher (lower) than was predicted, there was a tendency for the average marks awarded in other courses in that same school to be somewhat higher (lower) than was predicted. This evidence points to the existence of "hard" and "soft" schools.

(d) A study was made of the potential effect of the difference between the observed and predicted mean mark on the relative standing of a student in the provincial distribution of marks for a course. The effect of this difference in a typical "hard" or "soft" school would be to shift a student's mark by from one-fifth to

two-fifths of a standard deviation of the distribution of marks. A shift of this magnitude is not insubstantial, and yet, given that the effective range of a distribution of marks is approximately six standard deviations, a student who wanted to improve his standing would be better advised to study harder than to move to a "softer" school.

(e) An additional finding that bears on the issue of variation in marking standards emerged from our study of the predictability of first year university marks. It was discovered that the predictability of first year mark averages in the sample of secondary schools and students that was drawn for study was enhanced to a significant degree by taking into account the secondary school where a student took his SSHGD courses. Further analysis revealed, however, that the improved prediction possible in the sample could not be expected in the population of secondary schools and students. This result implies that the unadjusted secondary school mark average provides as good a basis as the adjusted mark average in selecting students on a competitive basis for admission to university.

10. A study was made of factors that affect school achievement and the planning for the future that students do. The results we obtained support the usual research finding that it is an advantage, insofar as doing well on achievement tests is concerned, to have parents who themselves attained high levels of formal education and to have a father who works at a job with relatively high social and economic status. It was also found, again not unexpectedly, that students who take more courses in subjects related to tests tend to score somewhat better on the tests.

11. A school effect for a test was defined to be the difference between the average score on the test for students attending the school and the average score that was predicted for

those students from background variables and the numbers of credits earned in English and mathematics courses. The effects defined in this way were found to be small but to be statistically significant. Moreover, the effects for different tests and for the future plans of students were positively related. However, none of the other school factors we studied--size, type, geographic location, setting, organization, period length--were related to the school effects we obtained.

## 2. FRANCOPHONE SSGD/SSHGD SURVEY

1. Females predominated in every SSHGD and SSGD group that was studied save one, the group labelled SSGD-OTHER. This group consisted mostly of students leaving school to take up employment. The Francophone male seems less inclined than the Francophone female to pursue education through to Grade Thirteen and beyond.

2. Students in the SSHGD population, and those in the SSGD population with plans to continue in secondary school, presumably to work on a SSHGD--this group comprised about 40 per cent of our Francophone SSGD sample--tended to come from homes where parents had more formal education and where fathers (male guardians) held better jobs than parents of the "other" SSGD students. The disparity was relatively small on the variable of formal education in the case of that 20 per cent of the "other" SSGD students who reported plans to pursue further education at the tertiary level; it was quite marked for both the factors of parental education and father's/male guardian's occupation in the case of that 40 per cent of SSGD students who were leaving school to take up work, get married, travel, etc.

3. The plans of Francophone students for postsecondary education are markedly affected by the unavailability of programs in the French language. A sizeable fraction of the students at both the SSHGD and SSGD levels who said they were leaving school

for work or some other reason indicated that they would have undertaken postsecondary training instead, had a program been available in French.

4. Students at the Interface were found to vary quite considerably in the number of courses they had taken during their secondary school careers in each of several different categories of courses. Not unexpectedly, students at the SSGD level who had plans to return to secondary school, presumably to work for an SSHGD, had taken, on the average, more courses at the advanced level of difficulty, than the students who had plans to pursue postsecondary study following the SSGD. The average student in both of these groups had taken a much more heavily "academic" program, consisting of more credits in total, more credits in the traditional academic (core) subjects, and more courses in mathematics than the average student in the SSGD group leaving school for work or other pursuits.

5. There was not as much diversity in the study of français and mathematics in secondary school as might have been expected. The vast majority of Francophone students at the Interface had earned credits in français at an average rate of one credit per year. Over 50 per cent of students in general, over 70 per cent of those in the SSGD population going on to secondary school and in the SSHGD population going on to postsecondary studies had earned credits in mathematics at the same rate.

6. Fewer than one-third of Francophone students at the SSGD level studied a Twelfth Grade course in history or geography.

7. Substantial differences were noted in the performances of different groups on the achievement tests. SSHGD students with plans to pursue postsecondary study outperformed the SSGD students, including those continuing on to Grade Thirteen, on the measures of French language competence. On the average, SSHGD students wrote better essays, gave evidence of better reading for comprehension, and performed the language achievement exercises of

the objective test better than the SSGD students. Among the SSGD students, those continuing in secondary school did best, on the average, on the tests of French language competence--with minor exceptions, they did better than the SSHGD group who were leaving school to take up employment or for some other reason--and on the test of arithmetical and algebraic competence. The poorest test performance, on average, was turned in by the SSGD group who planned to leave education to pursue other ends, such as work.

8. Despite the average differences in test performance noted among the different SSHGD and SSGD groups, the distributions of scores for all groups taking a given test showed substantial overlap.

9. The coefficients of correlation that were observed between teacher marks and test scores were, with one exception, positive and moderately high, well within the range that would be expected in light of previous research.

10. The mean mark awarded to these students in a school for whom course marks were available and who had taken a test related to the course was compared with the mean mark that it was predicted, on the basis of test performance, would have been awarded. This study revealed the following facts:

(a) A tendency was observed for the correlation between observed and predicted mean marks for courses at the SSHGD and SSGD levels to be positive. This conclusion is necessarily tentative because a relatively small number of schools was sampled in the Francophone survey and, as a consequence, the correlation coefficients were very unstable, subject both to reversals in sign and large changes in magnitude when as few as two schools were deleted from the computation of the correlation coefficient. The results do suggest, however, that there existed a tendency for students in schools where the average level of test performance was lower to receive lower marks, and for students in

schools where the average level of test performance was higher to receive higher marks. Teachers appeared to be sensitive, at least to some degree, to the academic standing of the students in their own school, relative to students at large, and accordingly to make some adjustment in the marks that they assigned.

(b) There was a tendency for the coefficient of correlation between the mean mark for a school, as predicted from test performance, and the <u>difference</u> between the observed and the predicted mean mark for a school to be negative. As before, this correlation was unstable due to the small sample of schools. But this correlation means that there was a tendency for students in schools where the average level of test performance was lower to receive somewhat higher marks on the average than their test performance would suggest they should have received, and for students in schools where the average level of test performance was higher to receive somewhat lower marks on the average than their test performance would suggest they should have received.

(c) The coefficients of correlation among the differences between observed and predicted mean marks for different courses were <u>not</u> consistently positive. This may be due to the fact that so few Francophone schools were involved in the study that the correlation coefficients were very unstable. In any event, we did not obtain evidence pointing to the existence of Francophone schools that were consistently "hard" or "soft" for all courses.

(d) A study was made of the potential effect of the difference between the observed and predicted mean mark on the relative standing of a student in the provincial distribution of marks for a course. The effect of this difference in a school that was typically "hard" or "soft" for a course would be to shift a student's mark

by from one-fifth to seven-tenths of a standard deviation of the distribution of marks. A shift of this magnitude is not insubstantial, although, given that the effective range of a distribution of marks is approximately six standard deviations, a student who wanted to improve his standing would be better advised to study harder than to move to a school that was known to assign higher marks for a course. This argument gains weight from the fact that on the evidence available on Francophone schools, there would be no reason to expect a school marking "soft" in one course to mark "soft" in other courses.

## 3. UNIVERSITY RECORDS SURVEY

1. The most interesting and important result that was obtained through the conduct of this survey concerns the predictability of the first year mark average in university. The coefficient of correlation between the Grade Thirteen mark average and the first year mark average was 0.59. When appropriate adjustments were made in the prediction equation to take account of differences among universities in marking standards and differences among the standards of marking applied in four university program areas--Humanities/Arts, Social Sciences, Sciences and Professions, the correlation increased to 0.64. Given available evidence from the past, back as far as 1956 when the departmental examination system was in full force, it is clear that teachers' marks in 1976 are as good a source of evidence on potential university achievement as the departmental examination results were, and as teacher marks were in the years immediately following the discontinuation of the SSHGD departmental examinations.

2. The addition of the secondary school attended by the student as a factor in the equation for predicting the first year university mark average significantly enhanced prediction in the

sample, but did <u>not</u> enhance the level of prediction that would be expected in the population beyond that which is attainable from use of only the Grade Thirteen mark average and knowledge of the university and program of study in which the student was enrolled. This suggests that a university admission decision based on the unadjusted Grade Thirteen mark average should be as "fair" to the student as a decision based on an adjusted mark average, where the adjustment is made using the procedure that was applied in this study.

## 4. LIMITATIONS

As is true of any empirical study, this one suffers from a number of limitations that must be borne in mind when the results are being interpreted. Four limitations are especially important.

1. Representativeness of the sample of schools. Not all the schools that were selected for sampling in the first instance agreed to participate in the study. Although an effort was made to replace the schools that declined with others from the same source cell of the sampling frame, this attempt was not always successful, as reflected by the fact that the sample consisted of only 67 schools instead of the target figure of 75. It is impossible to say how the results that are reported differ from those that might have been obtained had the original sample of schools all agreed to participate. In addition, the fact that fewer than the targeted number of schools participated surely has had an affect on the precision of results and perhaps also on their validity as a description of Ontario at large. The fact that most of the schools that refused to participate were located in one cell of the sampling frame meant that differential weighting could not be used as a means of compensating for the effect of schools failing to participate.

2. Motivation of students. It is clear from the relatively large number of students who were truant on the day of the testing, and also from the comments of some of the students who did participate and of some of the proctors, that there was no universally compelling reason for students to take the tests and do as well as they could. Undoubtedly, the challenge presented by the test was motivation enough for many students. But the fact remains that a student had nothing of extrinsic value to gain from doing his best on the tests. The extent to which motivation, or the lack of it, influenced the results cannot be known. (An adjustment was made for the effect of absenteeism, but this adjustment was unrelated to the effect that the testing situation had on the motivation of those students who did write the tests.)

3. Completeness of the design. At no point in the study was information obtained simultaneously on high school marks, tested achievement, and university success. In particular, the link from tested achievement to university success is missing. Consequently, we can only speculate about the relative or differential efficiency of high school marks and achievement tests in predicting university success. It is theoretically possible that marks and tests would be equally efficient in a selection process, but would select quite different students! If that were so, clearly the choice between marks and tests would be philosophical and ideological. Another possibility is that tests and marks are redundant in the prediction of university success, so either could be used. Or, each may contribute some unique and useful aspect to the prediction. It is a limitation of the study that we can only say from the evidence that university success is well predicted from high school marks, that high school marks correlate highly but with some systematic school biases with the test scores, and that adding school adjustments to a prediction of university success from high school marks would not add very much to prediction in the population. This is a partly incomplete puzzle.

4. Scope of the study. As a consequence of the extremely broad scope of Project II, an enormous amount of the time and energy of a large research team--at times numbering over 20 persons, not including those individuals in the secondary schools and universities who gave assistance in the collection of the data--was diffused in planning data collection procedures and monitoring both the outflow of materials from OISE to the schools and universities, and the inflow of returned materials. Because of this, we could not afford to concentrate on the issues surrounding a specific aspect of the study, no matter how intriguing some problem or finding in that part of the study might seem. A sense of closure was never achieved for any aspect of the study. An important example is the non-comprehensive coverage of the achievement tests relative to the content of the instruction. Because so many areas and populations were to be tested, it was necessary to restrict the test selection to limited, available instruments. Similarly, there were so many analyses, that detail was necessarily lost both in execution and in presentation.

## 5. EFFECT OF SHORT DEADLINE

In addition to the foregoing major limitations to the study, there are several aspects of the work that were affected by the pressure to produce a report in a very short time. The plain fact is that the time frame for the conduct of the study was so very short--not, it must be admitted, without reason--that corners had to be cut, both in the collection of the data and in the analysis of them. Two examples of what now appear to have been questionable decisions in collecting the data were: (i) the failure to ask schools at the time the data on programs and marks were collected to verify whether or not students in the sample had, by June, earned the credits required for an SSGD or an SSHGD, and (ii) the failure to take account of whether or not an SSHGD-level student had taken the Writing Test when drawing the sample of SSHGD-level students on whom to collect program and

mark data. As a consequence of the former decision, the conclusions of the study are limited to those students who were identified by school principals in April 1976 as the ones in the school who were eligible for the SSGD or the SSHGD, provided they completed the courses they were taking in a satisfactory fashion. It became apparent during the analysis of the data, but far too late to do anything about it, that a fraction of students included in the study very likely did not acquire diplomas as expected. Had time permitted the acquisition of this information from the schools and the rerun of all analyses, then the results could have been provided for only those students who had earned their diplomas in June.

A consequence of the second decision noted above is that the number of SSHGD students for whom we had marks in Grade Thirteen English and scores on the Writing Test was very small, particularly in large schools, where the percentage of SSHGD students assigned to the Writing Test was very small. (Recall that for practical reasons associated with the time required to score the Writing Test and the cost of doing so, at most 24 SSHGD students in each school were assigned to the test). Consequently, the regression analysis involving SSHGD-level English marks was based on fewer students than we had expected would be the case.

An example of an analysis that we would like to have performed on the data, but one that we could not do because of the pressure of time, is related to the study of diversity. The students in group SSHGD-POSTSEC might have been divided into separate groups consisting of those students who had applied to university, those who had applied to a CAAT, and those who either had applied elsewhere or had not applied anywhere. This breakdown might have provided results of more direct interest to Ontario universities and CAATS than those that have been reported. It is our hope that additional analyses of the data files assembled in Project II will be undertaken so that closure can be achieved on this issue and other issues of interest to the educational community of Ontario.

One further effect due to the lack of time remains to be cited. Those of you who managed to stay with the report to this point will certainly be aware--as we ourselves are--that it is much too long, and contains many too many tables. We are confident we could have done better; we did just as well as we could under the circumstances.

## REFERENCES

Carroll, J.B. *The teaching of French as a foreign language in eight countries*. Toronto: John Wiley and Sons, 1975.